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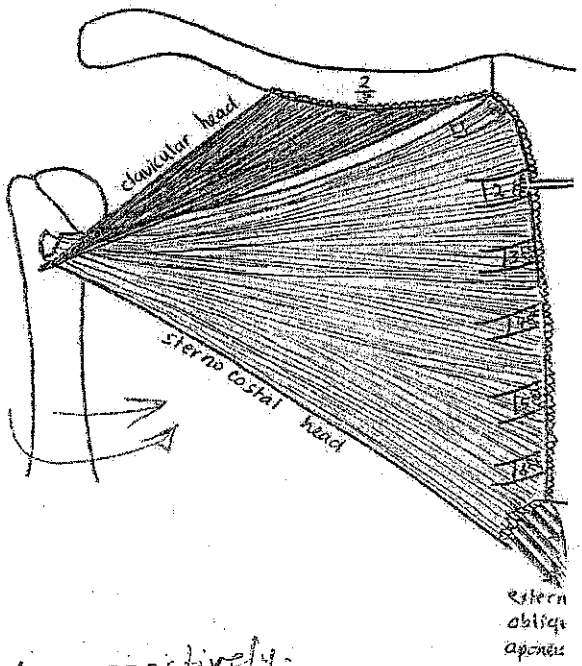
UPPER LIMB

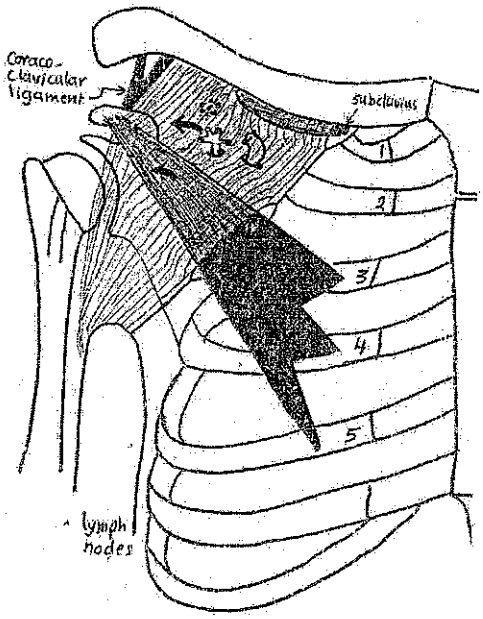
Pectoralis major

- **Origin:**
  1. Clavicular head: med $\frac{2}{3}$ of ant. surface of clavicle.
  2. Sterno-costal head:
     - Lat. border of sternum.
     - Upper 6 costal cartilages.
     - External oblique aponeurosis.
- **Insertion:**
  Lat. lip of bicipital groove
- **Action:**
  - Flexion by clavicular head.
  - Extension by sternocostal head
  - Adduction by 2 heads.
  - Med. rotation by 2 heads.
- **N. supply:** From lat. & med. cords respectively.



Pectoralis minor:

- **Origin:**
  Ribs 3, 4, 5 just lat. to costal cartilages
- **Insertion:** Coracoid process.
- **Action:**
  - Depression & protraction of scapula.
- **N. Supply:** Med. pectoral nerve.



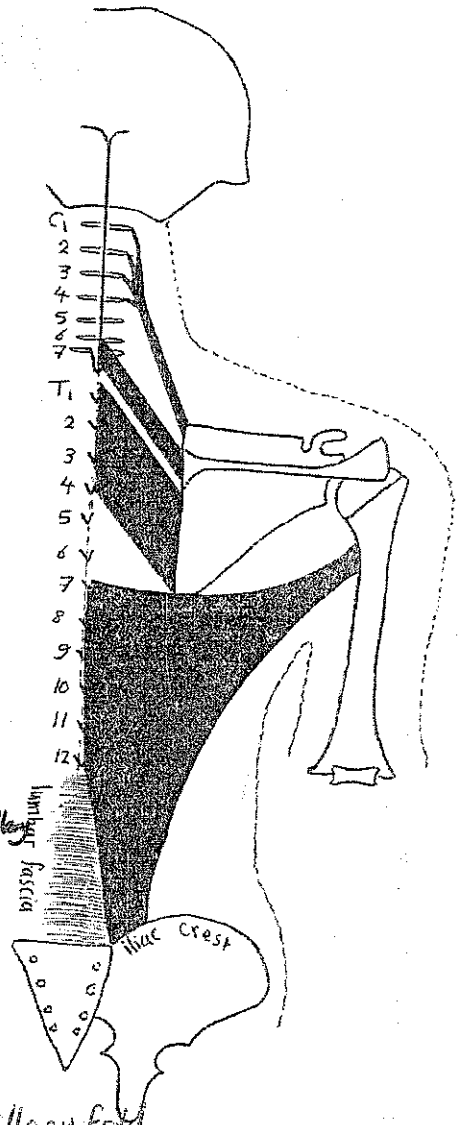
Latissimus dorsi

Origin:
- Spines of $T_{7,8,9,10,11,12}$
- Their supraspinous ligaments.
- Lumbar fascia.
- Iliac crest. (Post. ½).

Insertion:
- Floor of bicipital groove of humerus.

Action:
- Extension
- Adduction
- Med. rotation

] of shoulder joint.



Nerve supply: Nerve to latissimus dorsi
C 6, 7, 8 from post. cord.

Arterial supply: Thoracodorsal a. from subscapular from 3rd part axillary

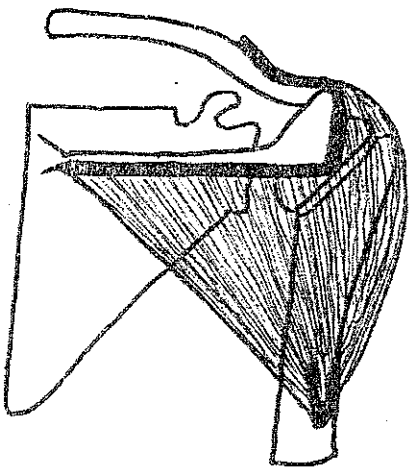
N.B. All muscles attached to ribs:
- Latissimus dorsi
- Serratus anterior
- Pectoralis major & minor

Help in inspiration.

- Latissimus dorsi shares in post. axillary fold.

Deltoid

Origin: V-shaped: - Clavicle: Ant. of lat. ⅓
- Acromion: lat. & post. borders.
- Spine of scapula: lower lip.



Insertion: Deltoid tuberosity of humerus (V-shaped).

Action:
- Anterior fibers: flexion & med. rotation.
- Posterior fibers: extension & lat. rotation.
- Middle fibers: abduction (15° - 90°).

Nerve supply: - Circumflex N.

Muscles of front of forearm.

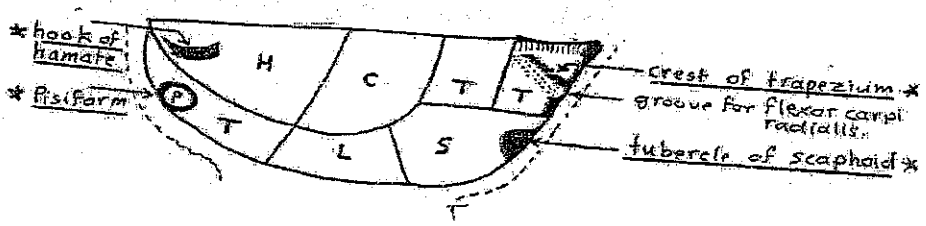
- Superficial group:

Muscle	Origin	Insertion	Action.
Pronator teres	• Humeral head: ① Lower part of medial suprachondylar line. ② C.F.O • Ulnar head: Coronoid process of ulna.	Pronator tuberosity of radius.	• Flexion of elbow. • Pronation.
Flexor digitorum superficialis	• Humero-ulnar head: ① C.F.O ② Coronoid process of ulna. • Radial head: Anterior oblique line of radius	Middle phalanges of medial 4 fingers	

- Deep group:

Muscle	Origin	Insertion
Flexor pollicis longus	. Ant. of radius. . Interosseous membrane.	Terminal phalanx of the thumb.
Flexor digitorum profundus	. Ant. of ulna. . Interosseous membrane.	Terminal phalanges of med. 4 fingers.

Carpal tunnel syndrome



Carpal bones are concave anteriorly due to 2 elevations on each side :

Lateral ← Crest of trapezium.
Tubercle of scaphoid.

Medial → Hook of hamate.
Pisiform bone.

Flexor retinaculum: Strong fibrous sheet of deep fascia, attaches to the four elevations forming a tunnel between it and the carpal bones. This tunnel is called → Carpal tunnel

Structures passing through the carpal tunnel:

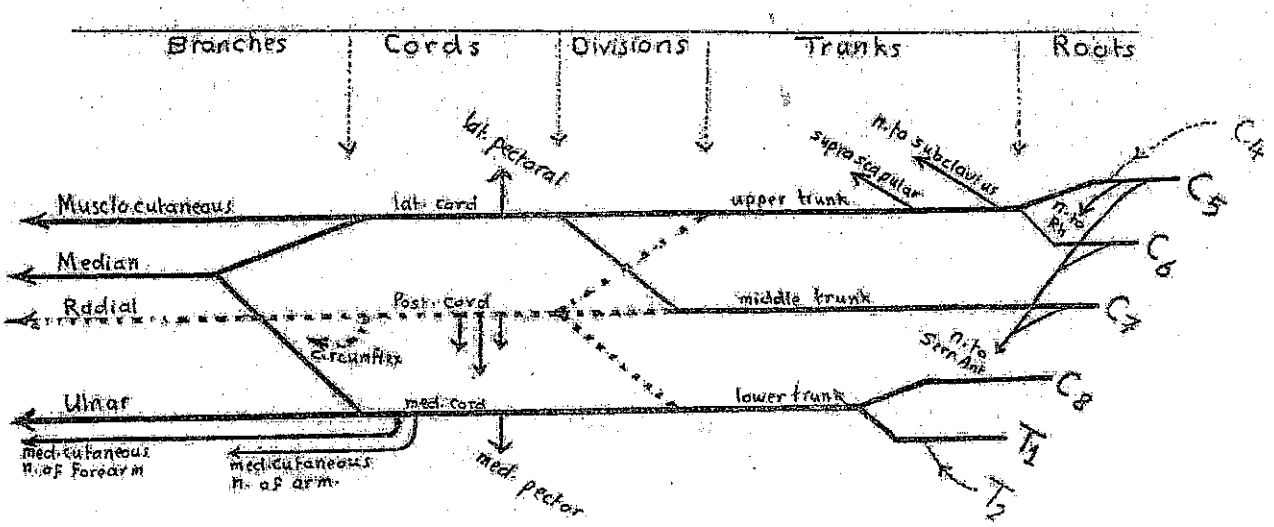
A) 9 tendons : 4 of Flexor digitorum superficialis.
4 of Flexor digitorum profundus.
1 of Flexor pollicis longus.

B) 1 nerve : Median nerve + 1 artery : recurrent br. of deep palmar arch.

Brachial plexus

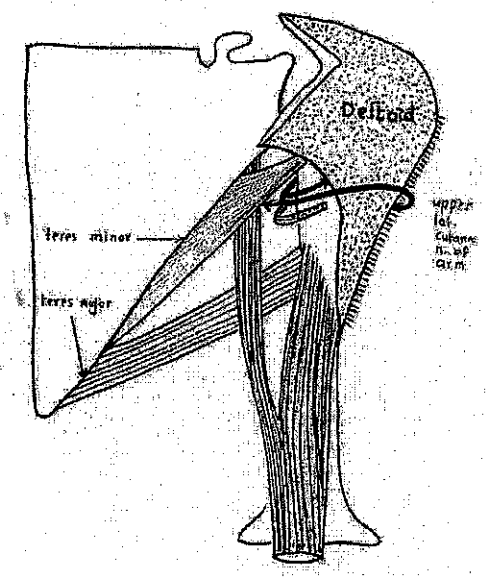
Formed by :

Anterior rami of : $C_{5,6,7,8} - T_1 \pm C_4, T_2$



Circumflex (Axillary) Nerve:

- Root value : $C_{5,6}$ from posterior cord.
- Begins at : Lower border of pect. minor.
- Along all its course it is accompanied with post circumflex humeral artery.
- Branches :
  - to deltoid
  - to skin of upper part of lat. side of arm.



Ulnar nerve :

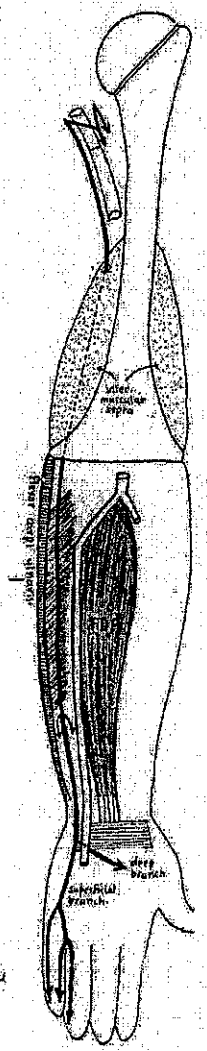
- Root value : $C_{8,2}$, T_1
- It is the continuation of med. cord.
- Begins at Lower border of p. minor.
- Ends on : flexor retinaculum

By: Giving superficial & deep br.

Course and relations:

- In arm: Medial to brachial artery & medial to axillary a. in axilla.
  - At level of insertion of coracobrachialis, it pierces med. intermuscular septum
  - Passes behind medial epicondyle.
- In forearm: Between 2 heads of flexor carpi ulnaris.
  - Then between ↗ Flexor carpi ulnaris ↘ Flexor digitorum profundus,
  - At middle of forearm it gives :
    1. Palmar cutaneous branch.
    2. Dorsal cutaneous branch.
- In hand:

Passes superficial to flexor retinaculum (medial to ulnar arte



Branches:

In forearm ↗ Muscular ↘ Cutaneous

In hand : ↗ Superficial ↘ Deep.

Median Nerve

- Root value : $C_{5,6,7,8} - T_1$
- Arises from Lateral & medial cords by 2 roots.
- Begins at: Lower border of p.minor.
- Ends behind: flexor retinaculum (in carpal tunnel)

By: Giving Lateral & medial branches.

Course and relations

- In arm: Lateral to brachial a.
  and lateral to axillary a. in axilla.
- At the level of insertion of coracobrachialis:
  It crosses the brachial a. from lat. to med.
  either superficially or deeply.
- Then it In forearm:
  Between two heads of:
  - Pronator teres.
  - Flexor digitorum superficialis.
- It descends between flexor digitorum superficialis and profundus.
- In hand:
  In carpal tunnel it divides into lat. & med. br.

Branches: "No branches in axilla & arm.

a) In forearm:

① Anterior interosseus n.
Supplies:
- Pronator quadratus.
- Flexor pollicis longus.
- Flexor digitorum
- Profundus (lat. ½).

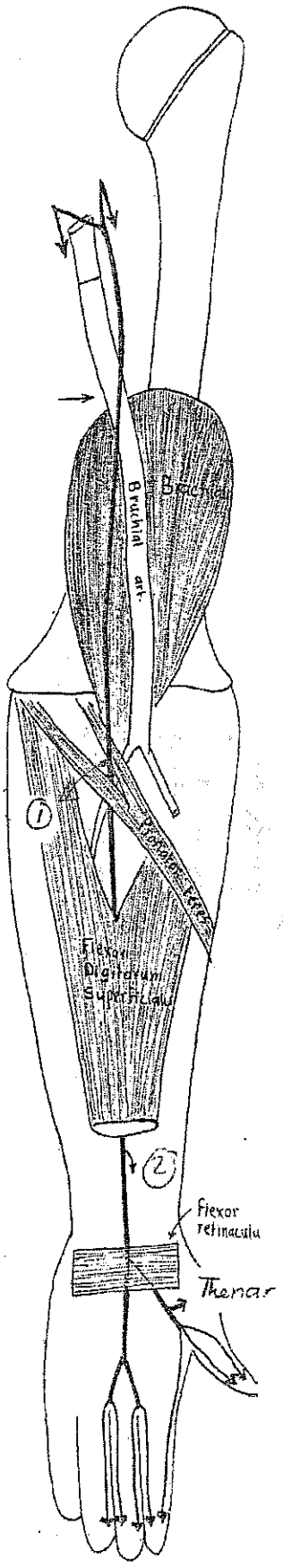
② Palmar cutaneous branch

③ Muscular branches.

b) In hand:

① Muscular:
- Thenar (except adductor pollicis).
- Lateral 2 lumbricals.

② Cutaneous: Lateral 3 ½ fingers.



Radial nerve

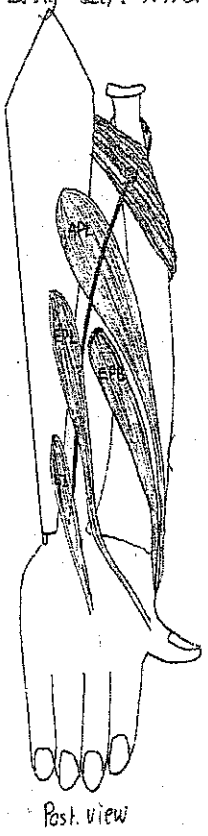
- Root value C5, 6, 7, 8, T1
  From posterior cord of brachial plexus.
- Begins at Lower border of p. minor.
- Ends in anatomical snuff box.
  By 5 terminal branches.

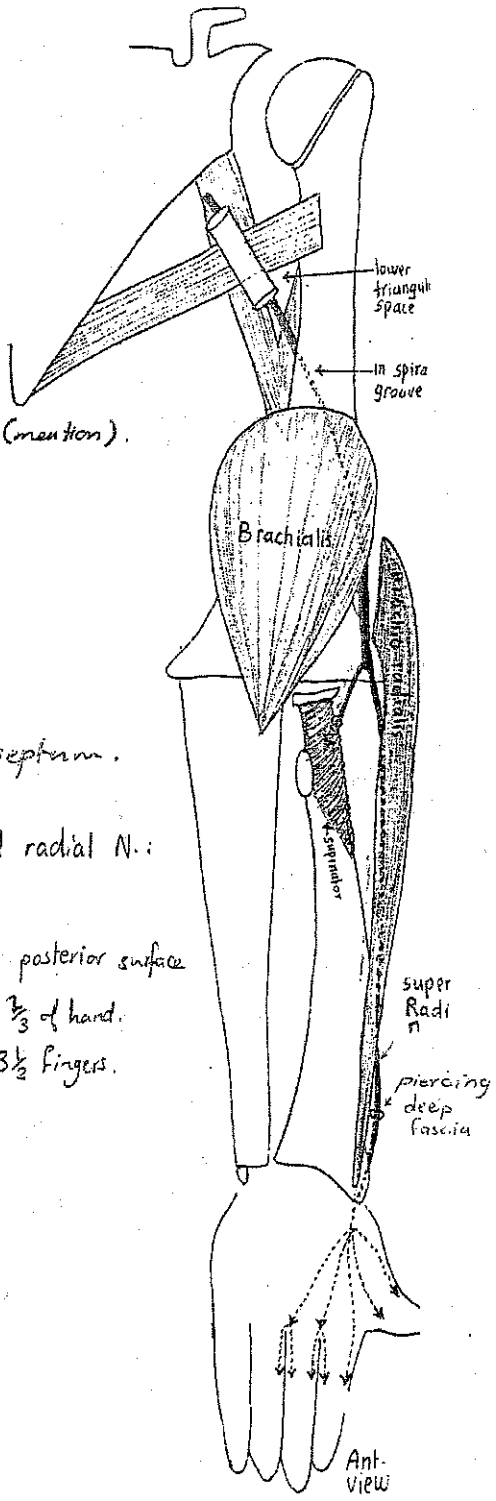
Course & relations

- **In axilla:** - Post. to it : post. wall of axilla (mention).
  - Ant. to it : axillary artery.
- **In arm:** - In spiral groove of humerus with profund brachii ar.
  - Appears laterally between brachialis & brachioradialis. after piercing Lat. intermuscular septum.
- **In forearm:**

1- Posterior interosseous N.:
- Pierces supinator.
- Supplies: 8 or 9 muscles.
  - 3 superficial ← ED, ED minimi, ECU
  - 5 Deep ← Supinator, APL, EPB, EPL, EI

2- Superficial radial N.:
- Supplies:
  Skin of posterior surface of: - lat. 2/3 of hand.
  - Lat 3½ fingers.



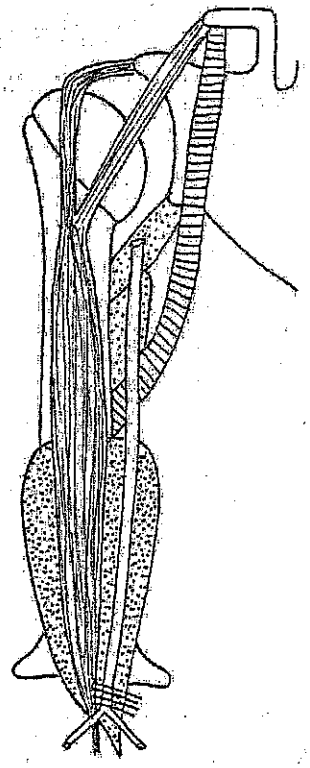


Branches of radial nerve:

- Main trunk
  1- Muscular : Triceps (in axilla).
  2- Cutaneous: - Lower lat. cut. n of arm
  - Post cut. n. of arm.] in axilla.

Brachial artery

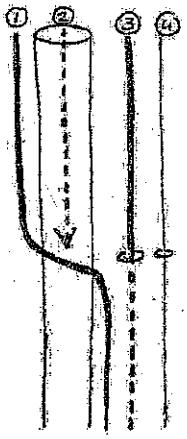
- Begins at lower border of teres major
- Ends at level of neck of radius



Relations:

- Posterior relations:
  1. Triceps (long head).
  2. Triceps (med. head).
  3. Coraco-brachialis.
  4. Brachialis + radial n.
- Lateral to it: Biceps.

- Relations with nerves:

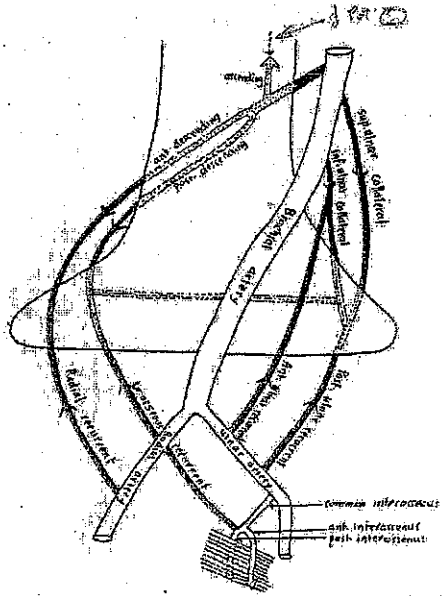


→ Level of insertion of coracho-brachialis.

① Median n. : lat. to it.
② Radial n. : post. to it.
③ Ulnar n. : med. to it.
④ med cut. n. of Forearm : med. to it.

Branches of brachial artery

1. Profunda brachii a.
   - branches: 1) ascending
     2) Ant. descending.
     3) Post. descending.
2. Sup. ulnar collateral.
3. Inf. ulnar collateral
4. Nutrient artery of humerus.



* Anastomosis around elbow = anastomosis between → brachial ar. & Radial & ulnar.

Arteries of upper limb.

Axillary artery

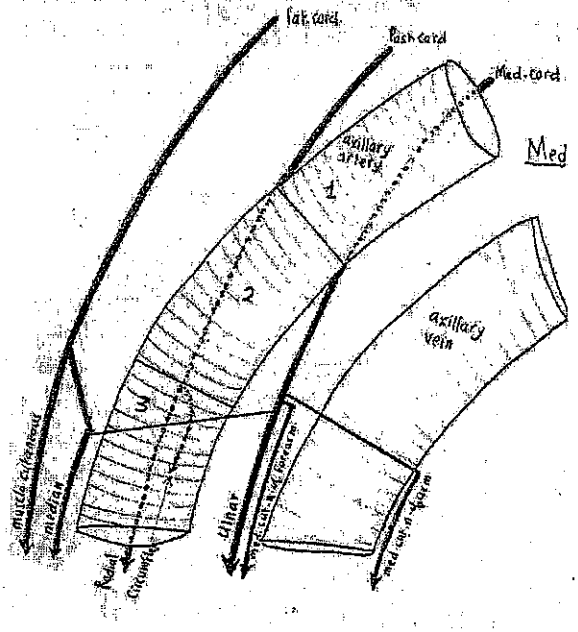
- Begins at : outer border of 1st rib (from subclavian).
- Ends at lower border of teres major by becoming brachialar.

Relations:

Ⓐ Relations with walls of axilla: Pectoralis minor divides it into 3 parts:
• 1st above it • 2nd deep to it • 3rd below it.

Relations	1st part	2nd part	3rd part.
Ant.	Pectoralis ms + clavicle	p. major + p. minor	pectoralis major.
Post.	- 1st 2 ribs. - Serratus ant.	Subscapularis	- Subscapularis - Latissimus dorsi - Teres major
Med	Serratus anterior + Nerve to serratus anterior.		
Lat	Humerus + Biceps + Coraco-brachialis.		

Ⓑ Relations with brachial plexus



Branches:

- 1st part: - Sup. thoracic.
- 2nd part: - Lat. thoracic.
  - Acromio thoracic.
- 3rd part: - Subscapular.
  - Anterior circumflex humeral.
  - Posterior circumflex humeral.

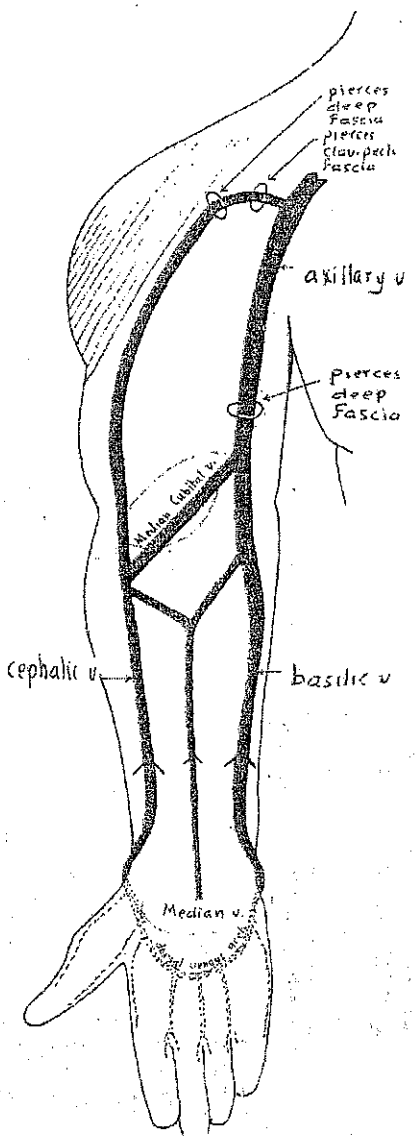
* Anastomosis around scapula = anastomosis between subclavian + axillary

* There is anastomosis between axillary & brachial arteries.

Veins of upper limb

- **Cephalic vein**

passes in deltopectoral groove where it pierces deep fascia, passes between two heads of pectoralis major where it pierces clavi pectoral fascia to end in axillary vein.

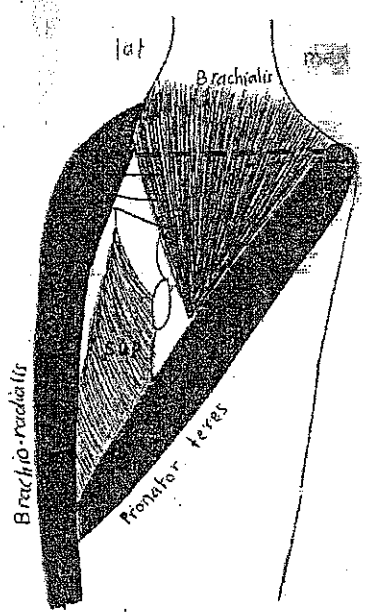


Cubital Fossa:

Triangular shaped space ant. to elbow.

Boundaries:
- Lat.: brachio-radialis.
- med.: pronator teres.
- Sup.: imaginary line between the 2 epicondyles.
- Floor: - Lat: Supinator
  - Med: brachialis.

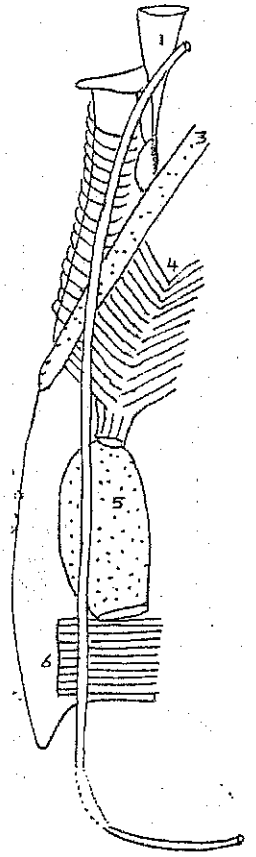
Contents:
- 1. Tendon : of biceps.
- 2. Nerves : - Radial n. (lat).
  - Median n. (med).
- 3 arteries : - Brachial artery.
  - Radial artery.
  - Ulnar artery.



Radial artery

- Begins at: level of neck of radius.
- Ends at: palm by deep palmar arch.

- Post. to it:
  1. Biceps tendon.
  2. Supinator.
  3. Pronator teres.
  4. Flexor digitorum Superficialis.
  5. Flexor pollicis longus.
  6. Pronator quadratus



- Superficial to it:
  - Brachioradialis.

Radial artery at wrist

- 1st ant. to styloid process of radius, then deep to ↗ Abductor pollicis longus. ↘ Extensor " ".

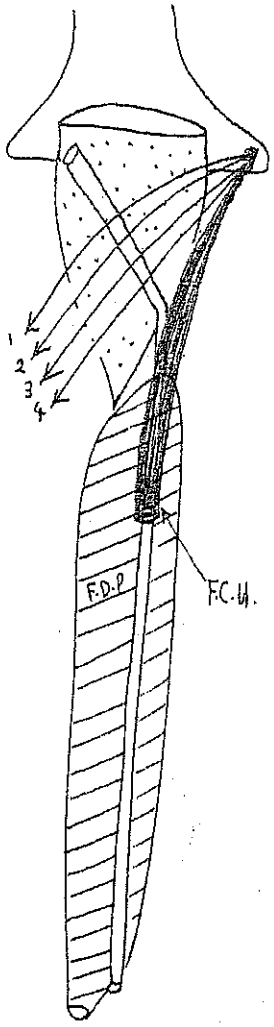
→ Enters anatomical snuff box on trapezium and scaphoid, then passes between two heads of ↗ 1st dorsal interosseous. ↘ adductor pollicis.

then reaches the palm → Deep palmar arch.

Ulnar artery.

- Begins at: as radial ar.
- Ends at: palm by superficial palmar arch.

- Oblique upper 1/3:
  - Post: Brachialis.
  - Ant:
    1. Pronator teres
    2. Flexor carpi radialis
    3. Palmaris longus.
    4. Flexor digitorum superficialis.



- Deep to 2 heads of Pronator teres.
- Then between 2 heads of Flexor digitorum superf.

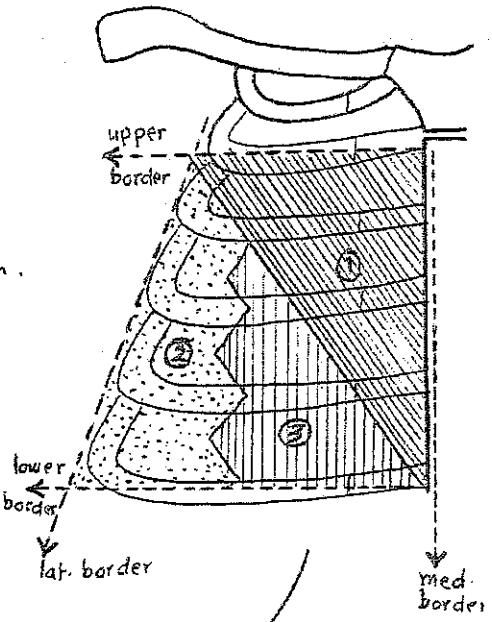
- Lower 2/3
  - Post: Flexor digitorum profundus.
  - Ant: Flexor carpi ulnaris

Relations with ulnar n.: Ulnar n. is medial

But: - In upper 1/3: away from eachothers.
- In Lower 1/3: close to each other.

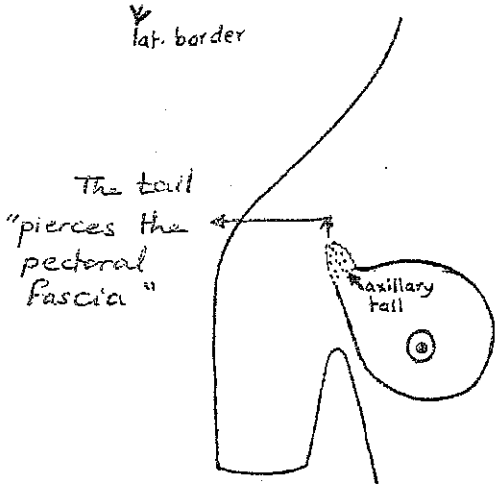
Breast

- **Boundaries:**
  - Upper border: along 2nd rib.
  - Lower border: along 6th rib.
  - Lateral border: at mid axillary line
  - Medial border: at lat. border of sternum.

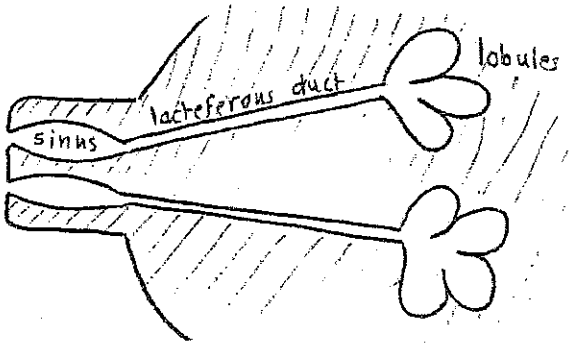


- **Posterior relations:**
  1. Pectoralis major.
  2. Serratus anterior.
  3. External oblique muscle.

- **External features:**
  1. Nipple.
  2. Areola.
  3. Axillary tail of breast.



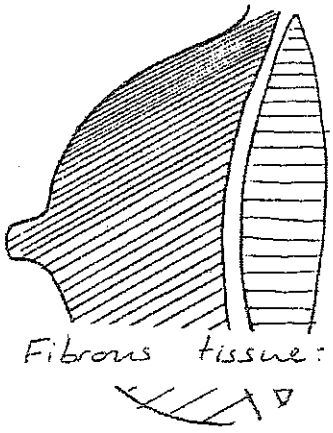
- **Internal features:**
  1. Glandular tissue:
     16-20 lobes each composed of many lobules.
  2. Fibrous tissue:
     = Suspesnory ligaments of breast.
     = Cooper's ligaments.
  3. Fatty tissue.



- **Nerve supply of the breast:**
  Intercostal nerves 2, 3, 4, 5, 6

- **Arterial supply:**
  1. Axillary artery.
  2. Internal mammary artery.
  3. Intercostal arteries.

- **Lymph drainage:** See theoretical notes.



HEAD & NECK

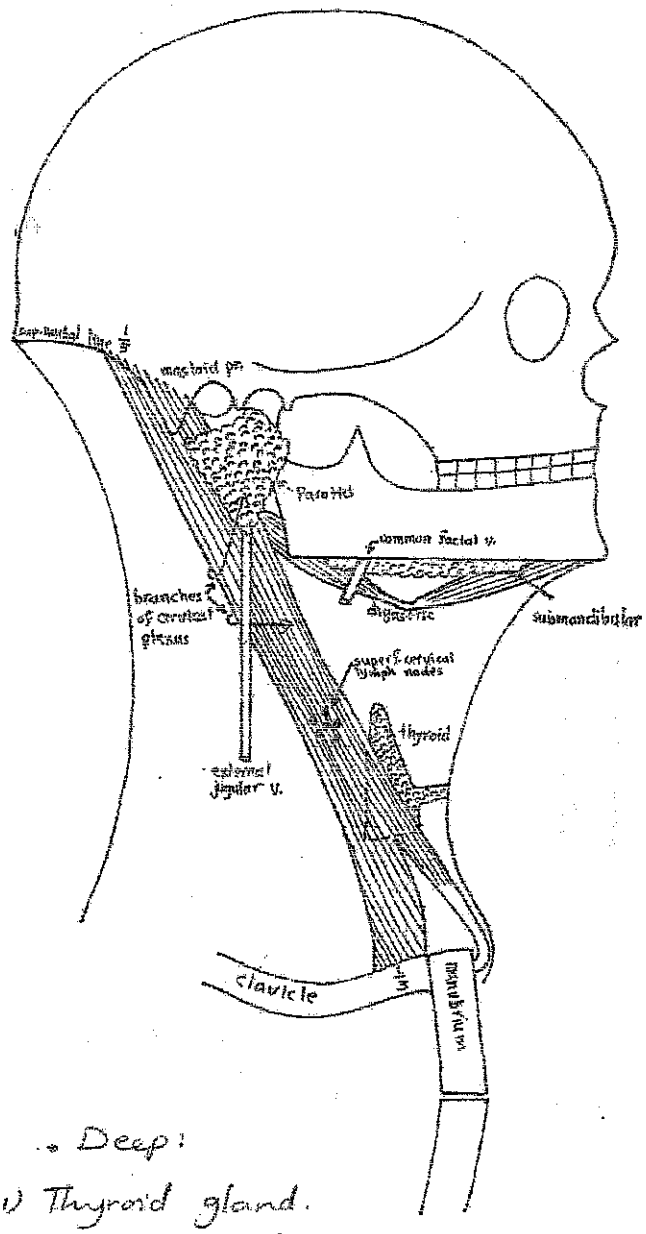
Sternomastoid

- **Origin** : 2 heads
  - Sternal head : (tendinous) from manubrium sterni (ant).
  - Clavicular head : (fleshy) from med ⅓ of clavicle (post).

- **Insertion** : 2
  - Mastoid process (outer surface).
  - Sup. nuchal line (lat ⅓)

- **Action** :
  - **If one muscle acts:**
    - Rotation of face to opposite side.
    - Lat. flexion of neck to same side.
  - **If two muscles act:**
    - Forward flexion of neck.
    - Forced inspiration.

- **Nerve supply**: 2
  - Motor : Spinal accessory n.
  - Sensory : C_2

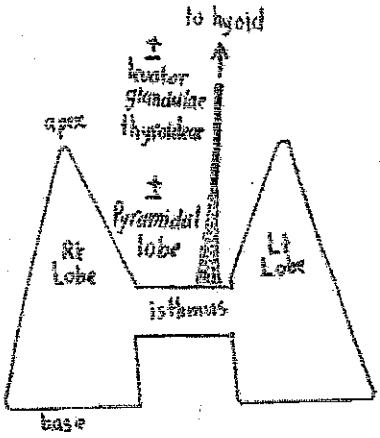


- **Relations**:
  - Superficial
    1) Parotid gland.
    2) Superficial cervical LNs.
    3) Cutaneous branches of cervical plexus.
    4) External jugular vein.
    5) Skin & platysma.
  - Deep:
    1) Thyroid gland.
    2) Deep cervical LNs.
    3) Roots of cervical plexus.
    4) Post. belly of digastric
    (+) Scalenus ant. & all of its anterior relations.
    (+) Carotid sheath & all of its contents.

Thyroid gland

2 lobes + isthmus in between
± pyramidal lobe.

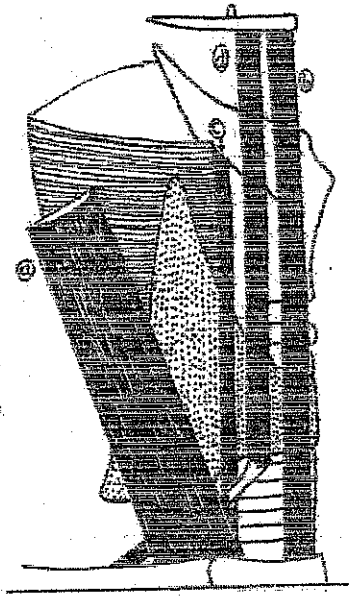
N.B. Apex of thyroid gland:
reaches oblique line of thyroid cartilage.



Relations:

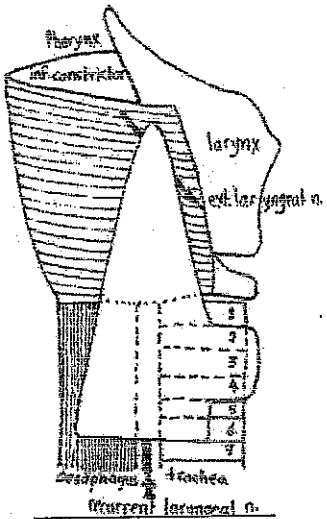
A] Anterolateral Surface: = Superficial relations:

1- Skin.
2- Platysma.
3- Investing fascia.
4- Muscles: a) Sternomastoid.
b) Sternohyoid.
c) Sterno thyroid.
d) Omohyoid (sup. belly).
5- Paratracheal fascia = capsule of thyroid.



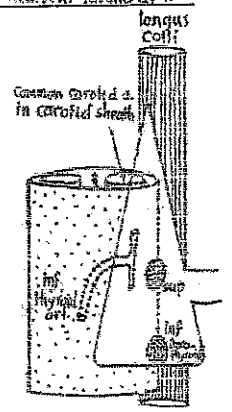
B] Medial surface:

1- Larynx.
2- Pharynx (inf. constrictor muscles of pharynx)
+ external laryngeal nerve.
3- Trachea. (upper 6 rings).
4- Oesophagus.
5- Recurrent laryngeal nerve.

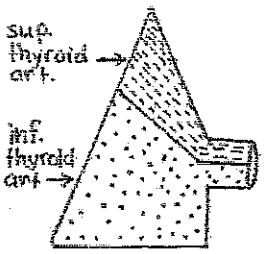


C] Posterior surface:

1 muscle: Longus colli.
2 arteries: . Common carotid (in carotid sheath)
. Inf. thyroid artery & its sup. & inf. branches.
2 glands: . Sup. & inf. parathyroids:
- Superior: at middle.
- Inferior: at base.



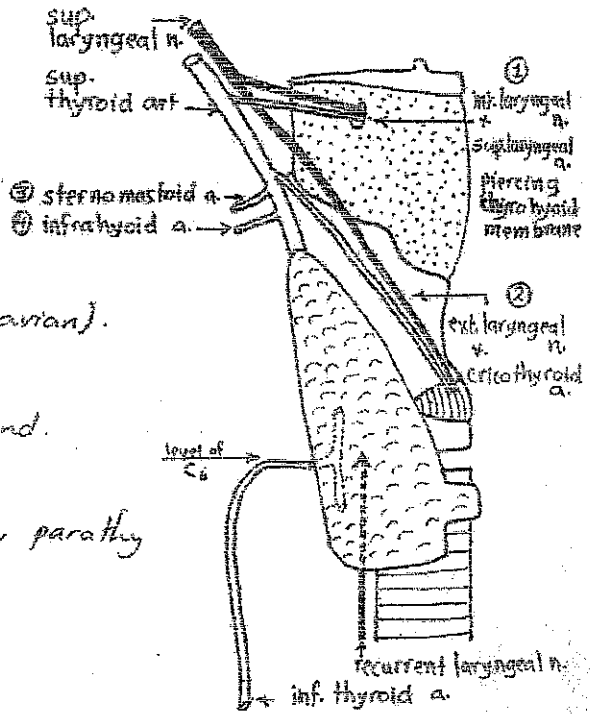
Blood supply of thyroid:



I - Arteries:

A) Superior thyroid artery:

- From external carotid artery.
- Close to: external laryngeal n. then diverge near the gland.
- Branches: 4 branches ①→④ التريس ,


sup. laryngeal n.
sup. thyroid art
① int. laryngeal n. + superior laryngeal a. piercing thyrohyoid membrane
③ sternomastoid a.
④ infrahyoid a.
② ext. laryngeal n. v. cricothyroid a.
level of C6
recurrent laryngeal n.
inf. thyroid a.

B) Inferior thyroid artery:

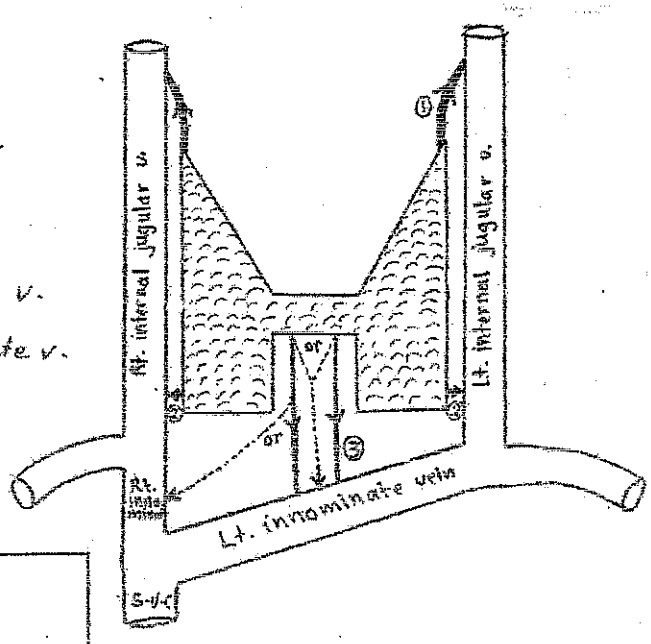
- From: thyro-cervical trunk (branch from 1st part of subclavian).
- Away from: Recurrent laryngeal n. then converge near the gland.
- Branches:
  - To larynx.
  - To pharynx, oesophagus, parathy
  - Muscular branches.

C) Thyroid ima artery:

- From arch of aorta.

II Venous drainage:

A) Superior thyroid vein: To IJV.
B) Middle thyroid vein: To IJV.
C) Inferior thyroid vein:
To corresponding innominate v.
or both end in Lt innominate v.



Parathyroid glands:

- 6 X 3 X 2 mm.
- Sup: behind middle of post. surface.
- Inf: behind base or may be below level of thyroid gland.
- Both are supplied by inf. thyroid artery.

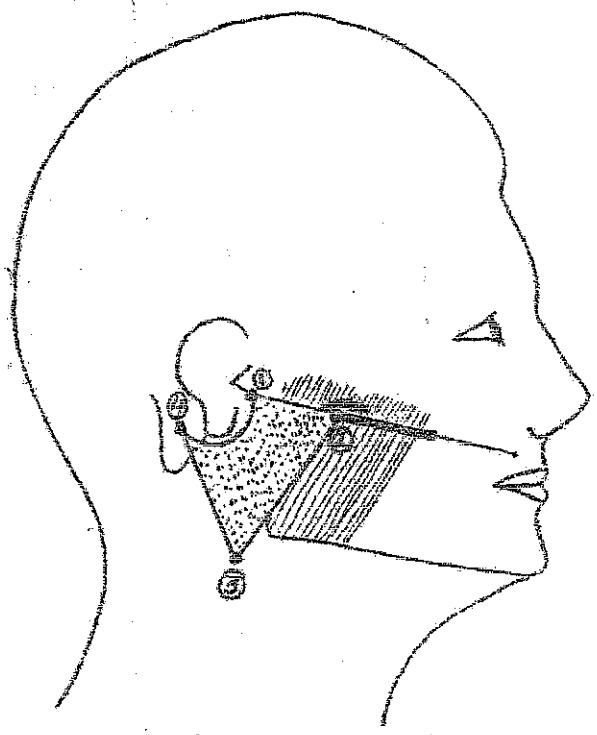
Parotid gland:

The largest salivary gland.

▪ Surface anatomy:

① Lower border of tragus (facial process).
② Just above centre of masseter.
③ 2 cm below & behind angle of mandible.
④ Centre of mastoid process (glenoid process).

* ant. border: ① → ② → ③
* Sup. border: ① → ④
* Post. border: ③ → ④



- Surface anatomy of its duct:
  Middle 1/3 of line between:
  - Lower border of tragus
  - Point midway between ala of nose & angle of mouth.

▪ Related ligaments & fascia:

1. Investing fascia: On lat. surface.
2. Stylomandibular lig.: on antero-medial surface.
3. Carotid sheath: on posteromedial surface.

▪ Relations of parotid:

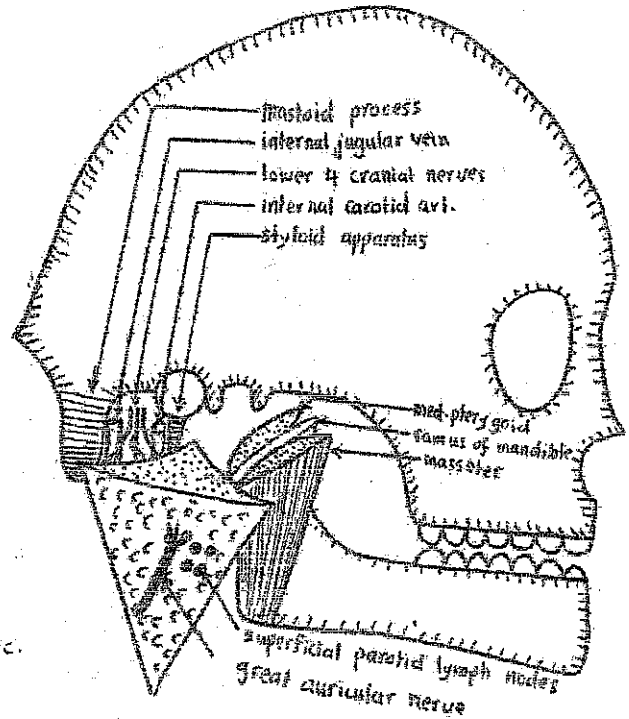
A] Relations of surfaces:

[1] Antero-medial surface:

ⓐ Ramus of mandible.
ⓑ Masseter (superficial to ⓐ).
ⓒ Med. pterygoid (deep to ⓐ).

[2] Postero-medial surface:

ⓐ Styloid apparatus.
ⓑ Internal carotid art.
ⓒ Lower 4 cranial nerves.
ⓓ Internal jugular vein.
ⓔ Mastoid process + Sternomastoid, Post. belly of digastric.



[3] Lateral surface:

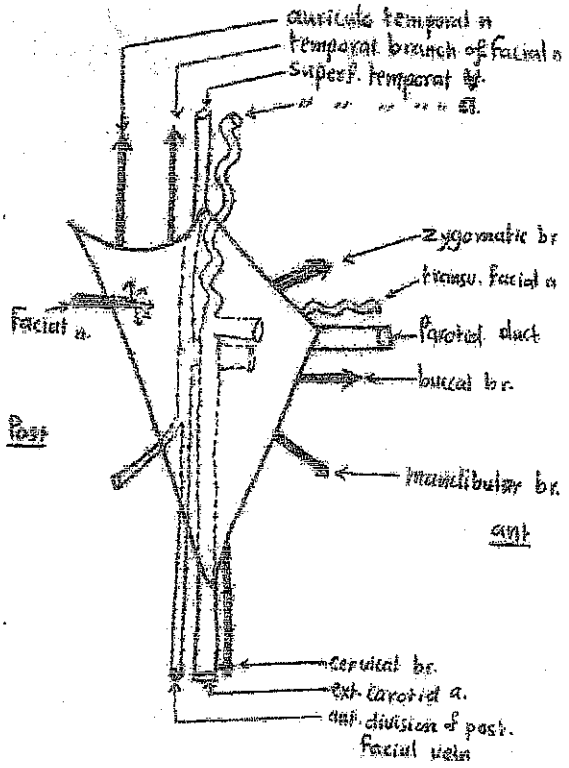
ⓐ Skin.
ⓑ Superficial fascia containing: Great auricular n., Superficial parotid LNs.
ⓒ Investing fascia.

B] Structures inside parotid:

* 3 arteries: 1. External carotid artery.
2. Maxillary artery.
3. Superficial temporal artery.

* 5 veins: 1. Maxillary vein.
2. Superficial temporal vein.
3. Post. facial vein
   - 4. Ant. division.
   - 5 Post. division.

* 6 nerves: 1. Facial nerve.
2. Its 5 terminal branches.



C] Structures appearing at the borders:

1- At ant. borders:
- Zygomatic, buccal & mandibular branches of facial n.
- Transverse facial artery.
- Parotid duct.

2. At Sup. border:
- Superficial temporal art. & vein.
- Temporal branch of facial nerve.
- Auricolo temporal nerve.

3- At inferior end:
- External carotid artery.
- Ant. division of post. facial vein.
- Cervical branch of facial nerve.

* Arterial supply: The 3 arteries inside it.
* Venous drainage: The 5 veins inside it.
* Nerve supply: Glossopharyngeal nerve.
* Parotid duct: - Pierces buccinator
  - Opens opposite to upper 2nd molar tooth.

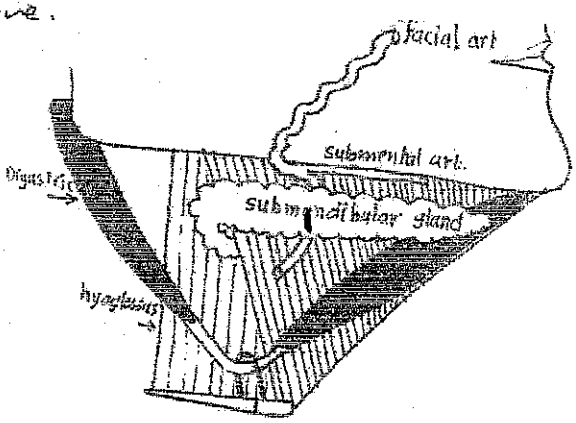
Submandibular salivary gland:

2 parts:

- Superficial part: (Superficial to mylohyoid) & fills the digastric Δ
- Deep part: (Deep to mylohyoid) & from which the duct begins.

Relations of superficial part:

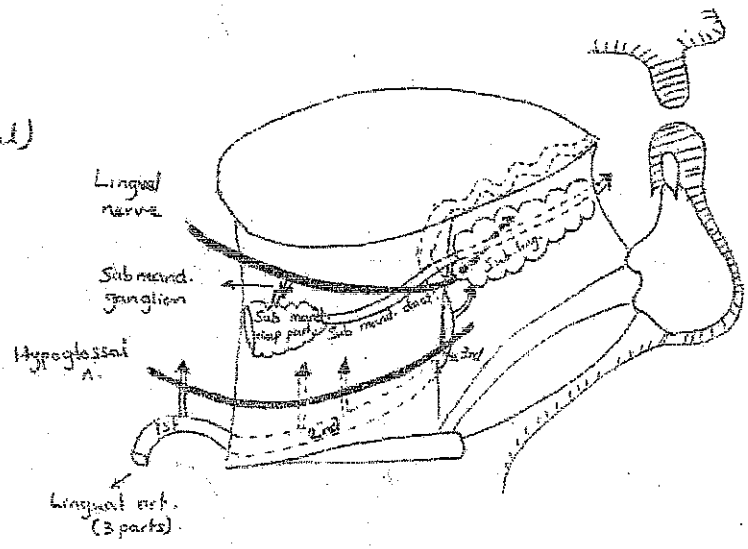
- Lat: Mandible (submandibular fossa) + facial artery in between.
- Med: Mylohyoid muscle + facial artery in between.
  - Facial artery has S-shaped course around it (some times inside it)
- Inf. = Superficial:
  - Skin
  - Superficial fascia containing:
    1) Platysma.
    2) Cervical branch of facial nerve.
    3) Common facial vein.
    4) Submandibular LNs.
  - Deep fascia (investing fascia): which is splitted to enclose the gland in a space (submandibular space) forming its capsule.



Relations of deep part:

- Between 2 nerves < lingual n. (sup). / hypoglossal n. (inf).
- Between 2 muscles < Mylohyoid (superficial) / hyoglossus (deep).

⊕ Submandibular ganglion is hanging between it and lingual nerve.

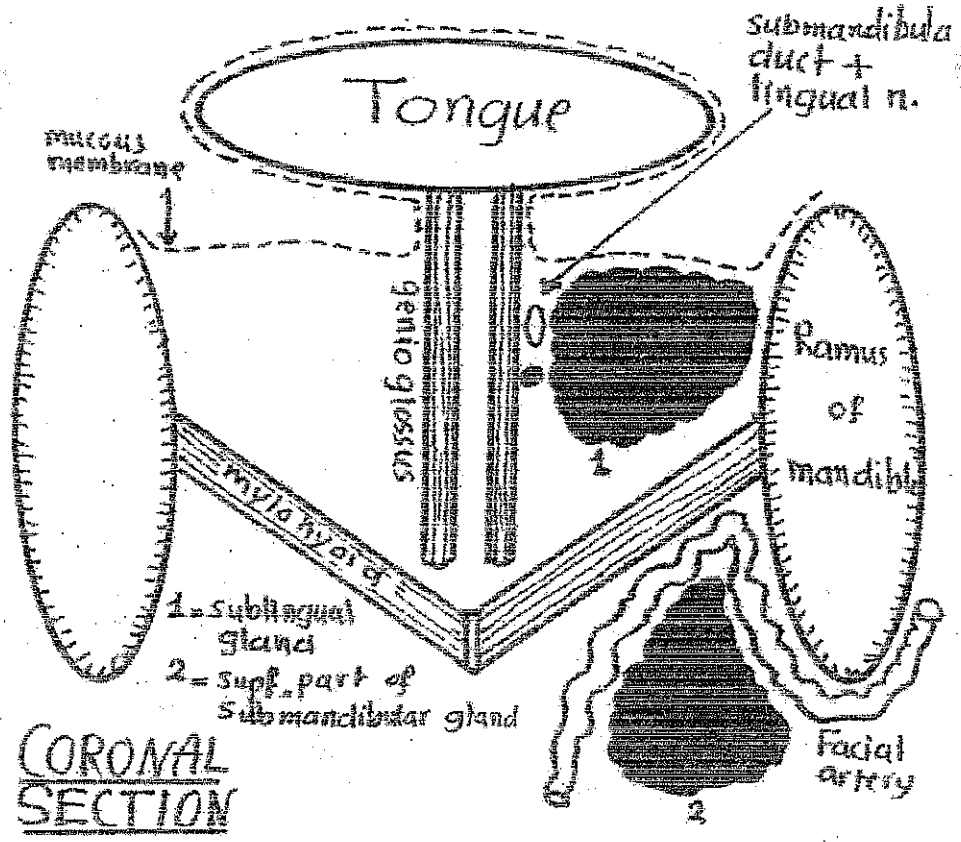


Submandibular duct:

- From deep part and passes anteriorly.
- To floor of mouth anteriorly.
  opening on top of raised papilla.

- **Relations with muscles:** On hyoglossus, then on genioglossus covered with mylohyoid.

- **Relations with lingual nerve:**
  - The duct: 1st below the nerve then crosses deep to it to be above it,
  - Then the duct recrosses the nerve but this time superficial to it to be below it.
- The duct crosses superficial to 3rd part of lingual artery (at ant border of hyoglossus).

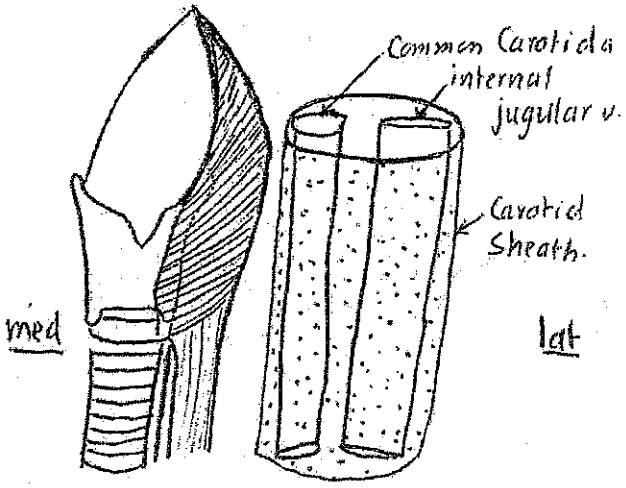


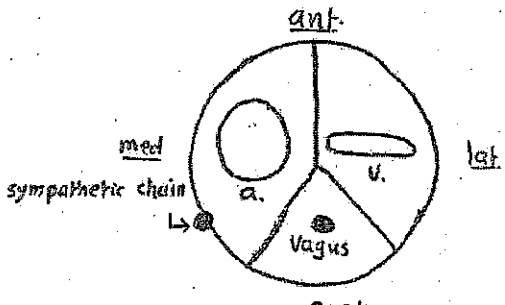
CORONAL SECTION

Arteries :

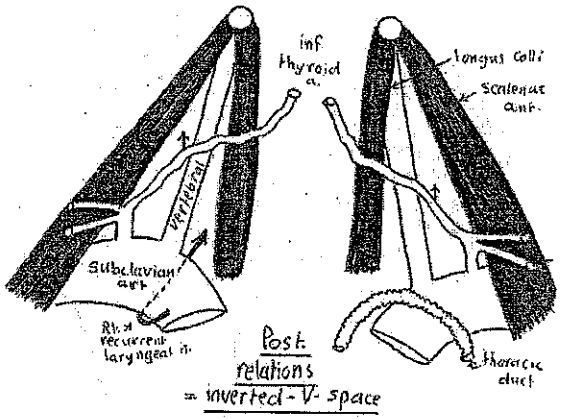
• Common Carotid artery:

- Begining :
  - Right CCA : from innominate artery (Deep to Rt sterno-clavicular joint).
  - Left CCA : from arch of aorta (Deep to centre of manubrium).
- End :
  - Ends opposite upper border of thyroid cartilage (C_{3-4}). by giving internal & external carotid arteries.
- Relations :
  - Ant : Thyroid gland & all its superficial relations.
  - Med : - As thyroid gland :
    - larynx - pharynx.
    - Trachea - Oesophagus.
    - recurrent laryngeal n.
  - Lat : IJV.
  - Post : Inverted V-space :
    - 2 arteries : - vertebral.
      - Inf. thyroid & its ascending cervical branch
    - 2 nerves : - Vagus n. (Postero-lateral).
      - Sympathetic chain (postero-medial).
    - 2 other structures : - On Lt : thoracic duct.
      - On Rt : Rt recurrent laryngeal nerve.
    - + Lower 4 cervical vertebrae.
  - Surrounded in all its course by carotid sheath.





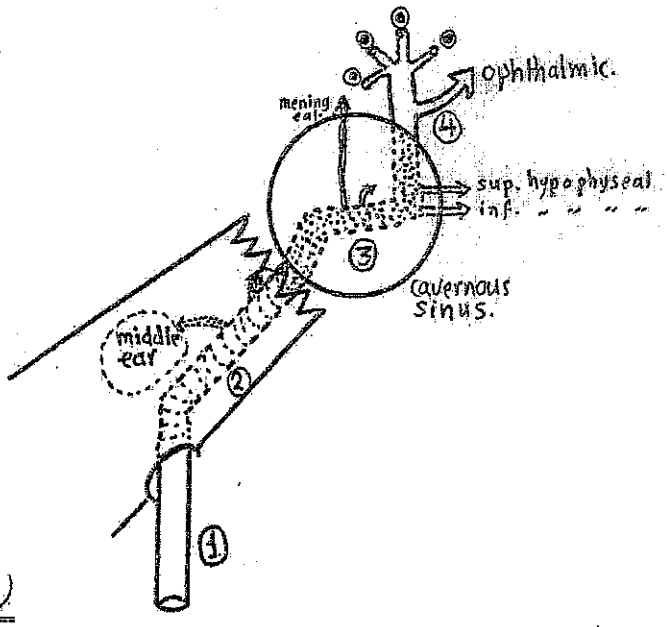
T.S. in Rt. Carotid sheath



Post. relations = inverted-V-space

Internal carotid artery:

- Begins at: Level of upper border of thyroid cartilage. (bet $C_3 - 4$).
- Ends in: Cranial cavity.
- Ends by: 4 terminal branches:
  - Ant. cerebral.
  - Middle cerebral
  - Post. communicating
  - Ant. choroidal.



- Has 4 parts:

[1] Cervical part (in neck)

- Direction: upwards.

[2] Petrous part (in carotid canal)

- Direction: Upwards, then forwards & medially.
  - Surrounded by sympathetic plexus.
  - In lower part of ant. wall of mid. ear.
- Branches:
  1. Carotico-tympanic a. : to middle ear.
  2. Pterygoid a. : to pterygoid canal.

[3] Cavernous part: (in cavernous sinus).

- Direction:
  - 1st upwards (to post. clenoid process).
  - Then forwards (to ant. clenoid process)
    (Grooving side of body of sphenoid)
  - Then upwards (penetrating diaphragma sellae)

S-shaped course OR Siphon course.

- Branches:
  1. Sup. & inf. hypophyseal → to pituitary gland.
  2. Cavernous & meningeal branches.

[4] Cerebral part: (intra-cranial part).

- after piercing the diaphragma sellae (between 2nd & 3rd cranial nerves).

Branches:

- 1st sends: ophthalmic artery.
- Then sends 4 terminal branches

Relations of ICA: (cervical part).

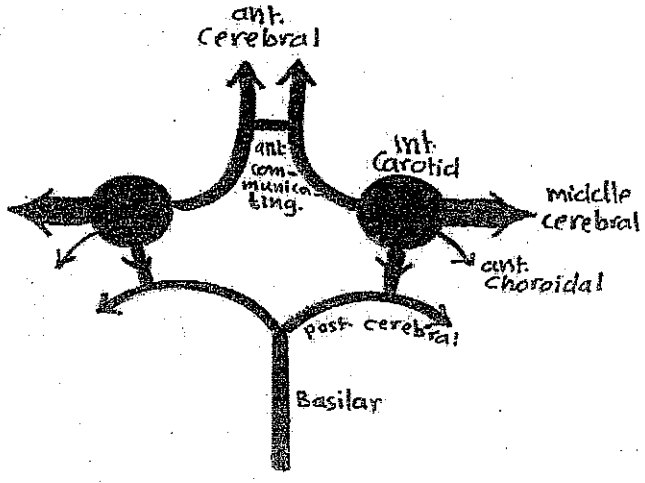
a- Superficial:

1- Skin - platysma + investing fascia.
2- Sternomastoid & post. belly of digastric.
3- Hypoglossal n. & transverse n. of neck.
+ All 5 structures between it & ECA.

b- Deep: 1- Pharynx.
2- Sup. laryngeal n.

c- In carotid sheath:

1- Postero-lateral: vagus.
2- Postero-medial: sympathetic chain.
3- Lat.: IJV.

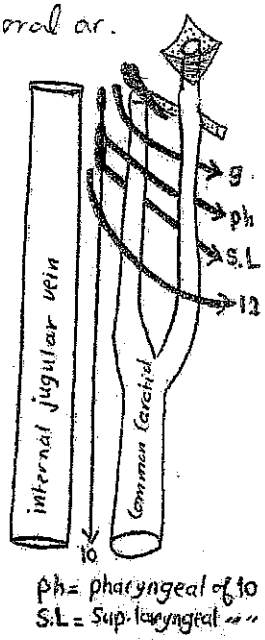


Circulus arteriosus "of Willis"

External carotid artery:

- Begins at: upper border of thyroid cartilage (C_{3-4}).
- Ends at: point midway between → Angle of mandible
  ↘ mastoid process.

inside parotid gland by giving: . Maxillary ar.
. Superficial temporal ar.



ph = pharyngeal of 10
S.L = Sup. laryngeal "

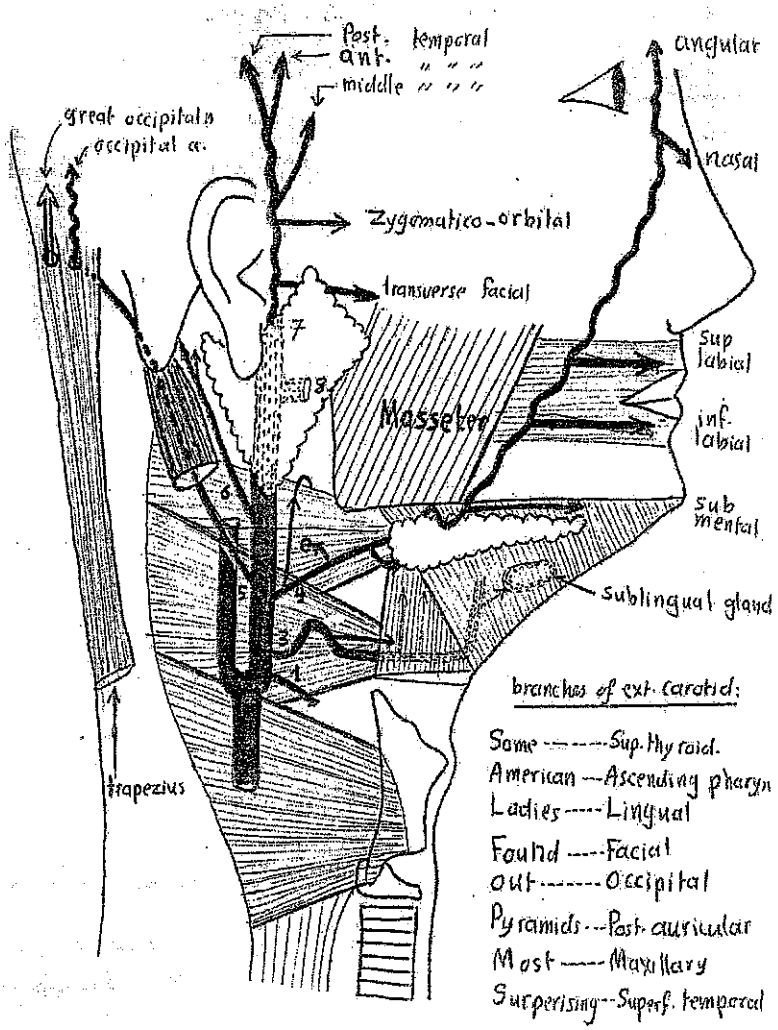
- Relations of ECA:

a) Superficial:
1- Skin - platysma - investing fascia.
2- Sternomastoid - post. belly of digastric.
3- Hypoglossal n.

b) Deep: 1- Pharynx.
2- Sup. laryngeal n.
3- All 5 structures between it & ICA.

- Branches of ECA:

① Superficial thyroid artery:
② Ascending pharyngeal ar.
③ Lingual ar.
④ Facial ar.
⑤ Occipital ar.
⑥ Post. auricular ar.
⑦ Superficial temporal ar.
⑧ Maxillary ar.



Middle meningeal artery:

- Branch from the first part of maxillary artery.

Relations:

- Between lat. & med. pterygoids.
- Between 2 roots of auriculo temporal n.
- Through foramen spinosum with nervous spinosus.
- Inside skull, it passes adherent to bone (extra-dural) out side two layers of dura.
- It doesn't pierce dura.

Branches:

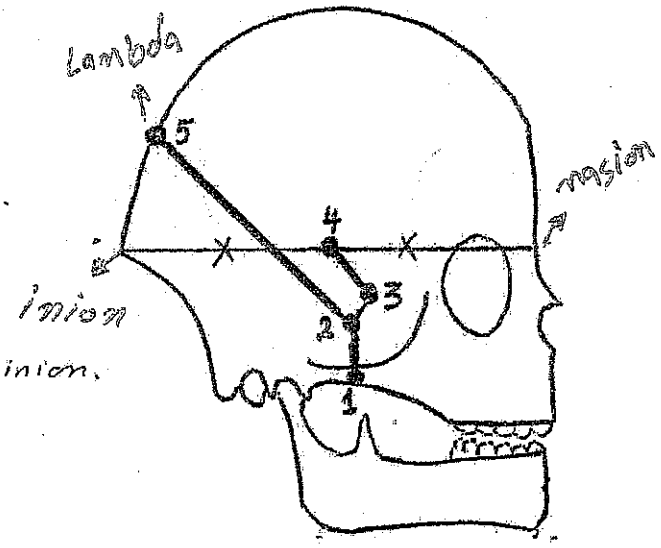
1- Frontal branch (ant).

2- Parietal branch (post.)

- No branches to the brain.

Surface anatomy:

- Point 1: Middle of zygomatic arch.
- Point 2: 2cm above point 1
- Point 3: Centre of pterion.
- Point 4: Mid way between nasion & inion.
- Point 5: Lambda.



- Main stem: 1 → 2
- Frontal branch: 2 → 3 → 4
- Parietal branch: 2 → 5

** Point 3 is the commonest site of haemorrhage.

Middle meningeal artery supplies:

1- Dura mater of ant & middle cranial fossae.

2-
- Facial n.
- Otic ganglion.
- Trigeminal ganglion.

3- Temporal branches (pass via small foramina in greater wing to anastomose with deep temporal arteries).

4- Sup. tympanic artery: supplies sup. part of ear drum.

Scalp

- Layers :
  - S → Skin.
  - C → Connective tissue.
  - A → Aponeurosis (epicranial aponeurosis)
  - L → Loose areolar connective tissue.
  - P → Periosteum of skull bones.

- Blood supply:
  5 pairs of arteries, 3 from external carotid and 2 from internal carotid
  - From external carotid:
    1- Superficial temporal artery.
    2- Occipital artery.
    3- Past- auricular artery.
  - From internal carotid:
    1- Supratrochlear artery.
    2- Supra orbital artery.

- Nerve supply:
  - Supratrochlear n. & supraorbital n. from ophthalmic division of trigeminal n.
  - Greater & Lesser occipital nerves
  - Zygomatico-temporal n.
  - Auriculo-temporal n.

- Lymphatic drainage:
  - There are no LNs in the scalp.
  - Lymphatic drainage is to pre- & past-auricular LNs.

LOWER LIMB

Lower Limb

Muscles of front of thigh.

Psoas major:

- Origin: By 5 slips from the five lumbar vertebrae
  their → bodies
  → Transverse processes
  → Intervertebral disks.

  . The upper slip also arises from T_{12}.

- Insertion:
  . with iliacus (ie ilio-psoas) into lesser trochanter of femur.

- Action: 1. Flexion of hip
  → Flexion of thigh OR → Flexion of trunk.

  2. Lateral rotation of hip.

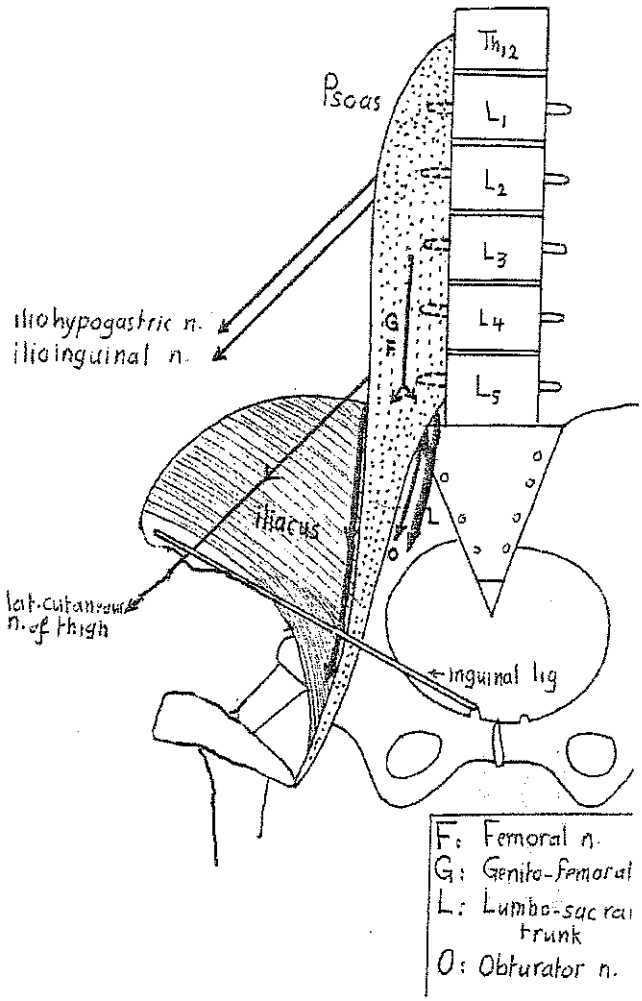
- Nerve supply: $L_{2,3}$

- Relations: (In abdomen: covered ē viscera).

A) Deep to its tendon: hip joint.

B) With lumbar plexus: the plexus lies inside psoas & the branches appear:

- From lateral side: - ilio-hypogastric n.
  - ilio inguinal n.
  - lat. cut. n. of thigh.
  - Femoral n.
- From med. side: - Obturator n.
  - lumbo-sacral trunk.
- From anterior surface: - Genitofemoral n.



C) Anteriorly crossed by:
- Root of mesentery.
- Gonadal vessels.
- Ureters.

Quadriceps

- Origin:

- **Vastus medialis:**

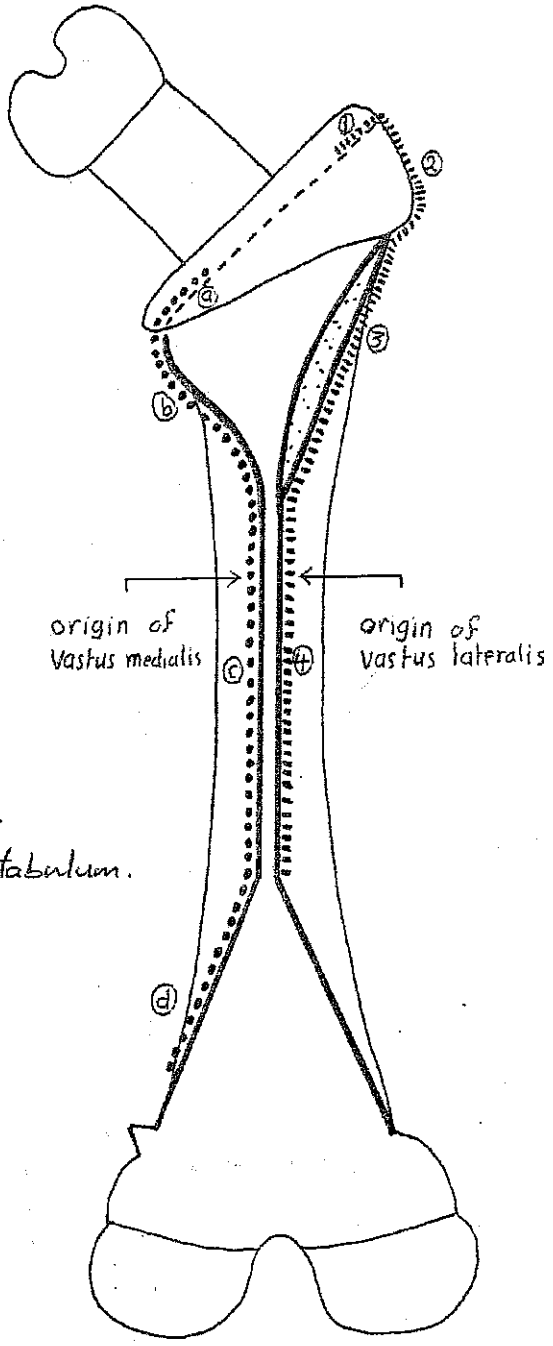
ⓐ Lower part of intertrocheric line.
ⓑ Spiral line.
ⓒ Med. lip of linea aspra.
ⓓ Med. supracondylar line.

- **Vastus lateralis:**

① Upper part of intertrochanteric line.
② Base of greater trochanter.
③ Lat. lip of gluteal tuberosity.
④ Lat. lip of linea aspra.

- **Vastus intermedius:**
  - Antero-lateral surface of femur.

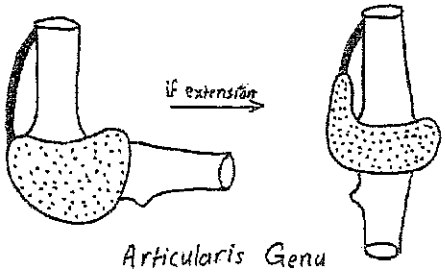
- **Rectus femoris:**
  - Straight head: from ant. inf. iliac spine.
  - Reflected head: from upper margin of acetabulum.



- Insertion:
  - 1st into patella, then through patellar ligament to tibial tuberosity.

- Action:
  - Extention of knee then relax.
  - Flexion of hip by rectus femoris.

- Nerve supply:
  Femoral nerve.



Articularis Genu

Femoral artery

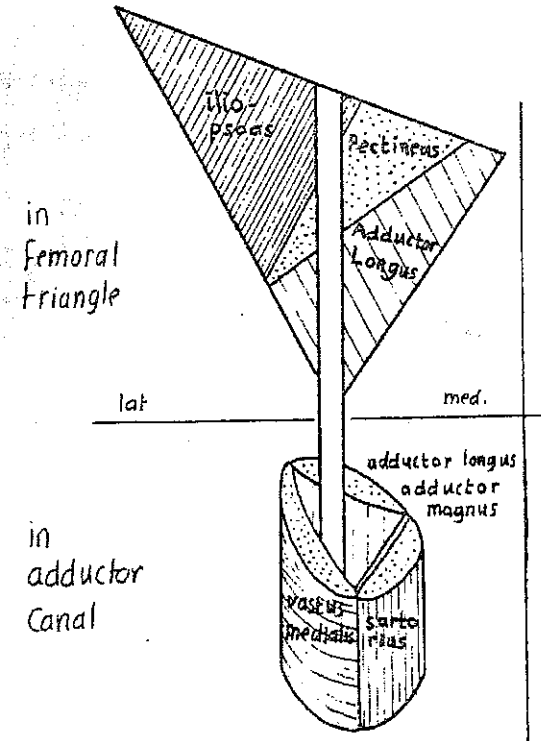
- Begins at: mid inguinal point (midway between ant. sup. iliac spine & Symphesis pubis) as a continuation of external iliac artery.

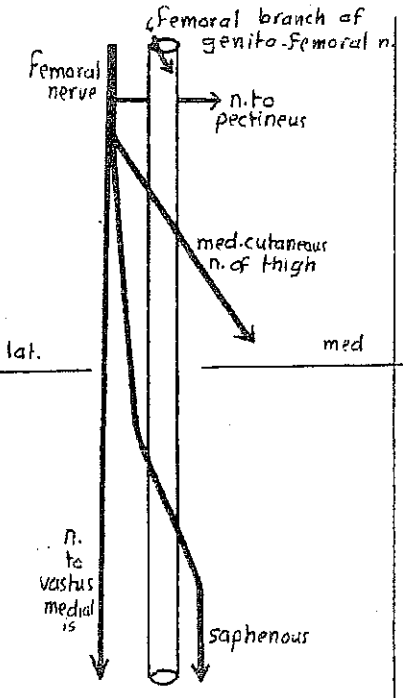
* N.B:

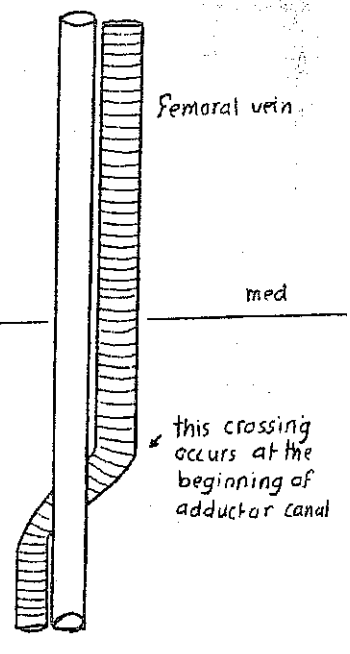
Middle point of inguinal ligament:
midway between → ant. sup. iliac spine.
↘ Pubic tubercle.

it lies 7 mm lateral to mid inguinal point.

- Ends at: Adductor hiatus (opening in adductor magnus) at the end of adductor canal (at junction of upper 2/3 & lower 1/3 of med. of thigh.).
- Ends by: becoming popliteal artery.







Relations with muscles

Ⓐ in femoral triangle:
- deep: • iliopsoas
  • pectineus
  • adductor longus
- superficial: skin + fascia

Ⓑ in adductor canal:
- ant: vastus medialis
- post: adductor longus + magnus
- med: sartorius lined with aponeurosis

Relations with nerves

Ⓐ in femoral triangle:
- lat: - femoral n.
  - saphenous n.
  - n. to vastus medialis.
- ant: • femoral branch of genito femoral n.
  • med. cutaneous n. of thigh.
- post: n. to pectineus.

Relations with femoral vein

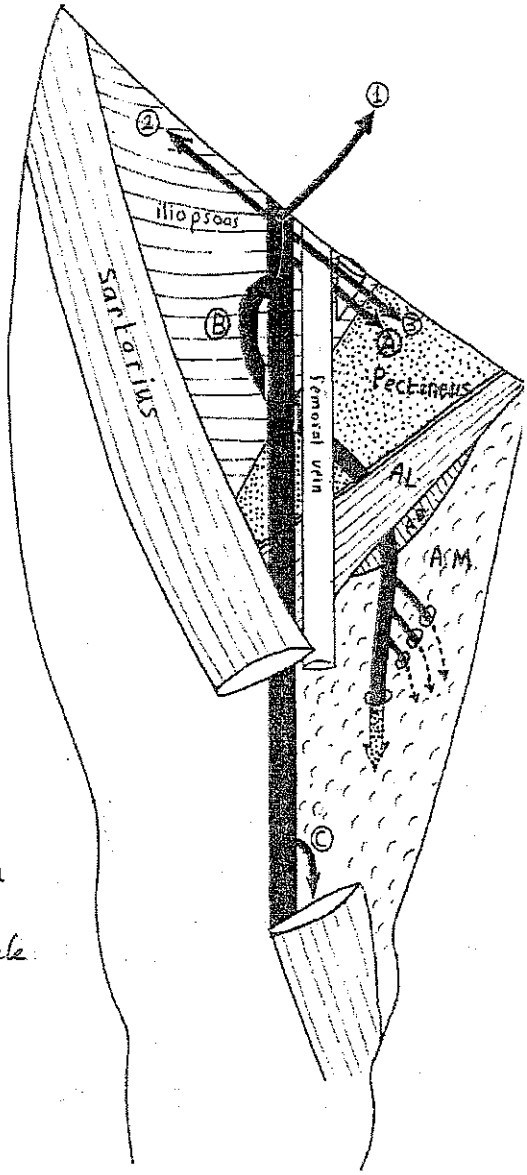
- in femoral triangle: vein is med.
- in adductor canal: vein crosses deeply from med. to lat.

Ⓑ in adductor canal:
- n. to vastus medialis: continues lat. to it.
- saphenous n.: crosses the artery superficially from lat. to med.

Branches of femoral artery:

* 3 Superficial:
1) Superficial epigastric a.
2) Superficial circumflex iliac a.
3) Superficial external pudendal a.

* 4 Deep branches:
1) Deep external pudendal a.
2) Profunda femoris a. (= deep femoral a)
   - Arises 4 cm below inguinal lig.
   - Ends by piercing adductor magnus.
3) Descending genicular a.
4) Muscular branches.



Surface anatomy of femoral artery:

Upper 2/3 of line connecting → Mid inguinal point
→ Adductor tubercle

(In crossed leg position
= Abduction & lat. rotation & flexion of thigh)

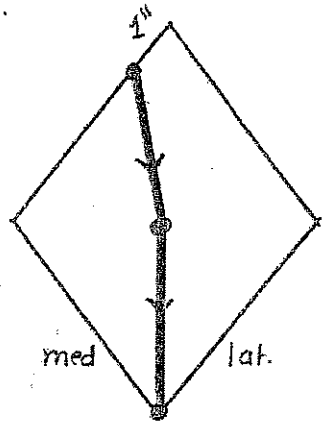
Popliteal artery

- Begins at : Adductor hiatus (as continuation of femoral a.).
- Ends at : Lower border of popliteus muscle.
- Ends by: 2 terminal branches : . Ant. tibial a.
  . Post. tibial a.

Branches:

- Cutaneous : Sural artery
- Musclular : To boundaries & floor of popliteal fossa.
- Articular : 5 genicular

+ 2 terminal branches.



Surface anatomy

Veins of Lower Limb.

(A) Superficial veins

1- Great saphenous vein:

- Begins at : med. border of foot.
- Begins by : Dorsal venous arch.
- Ends by : 1) Cribriform fascia.
  2) Femoral sheath.

Course & relations:

- In front of med. malleolus (with saphenous n.)
- Along med. border of tibia (with saphenous n.).
- Curves behind knee.
- Ascends on medial side of thigh then pierces Cribriform fascia.

Tributaries:

- 3 main tributaries : 1) Superficial epigastric v.
  "as their arteries" 2) Superficial circumflex iliac v.
  3) Superficial external pudendal v.
- 3 in thigh : 1) Antero-lateral femoral v.
  2) Postero-medial femoral v.
  3) Accessory saphenous v.
- 2 in leg : 1) Ant. vein of leg.
  2) Post. vein of calf.

Communications

- With small saphenous vein:

1) From great → Small ⟷ From great saph. above med malleolus
   To small saph. at middle of leg.

2) From small → great ⟷ From small saph. at middle of leg
   To great saph. at back of knee.

2- Small saphenous vein:

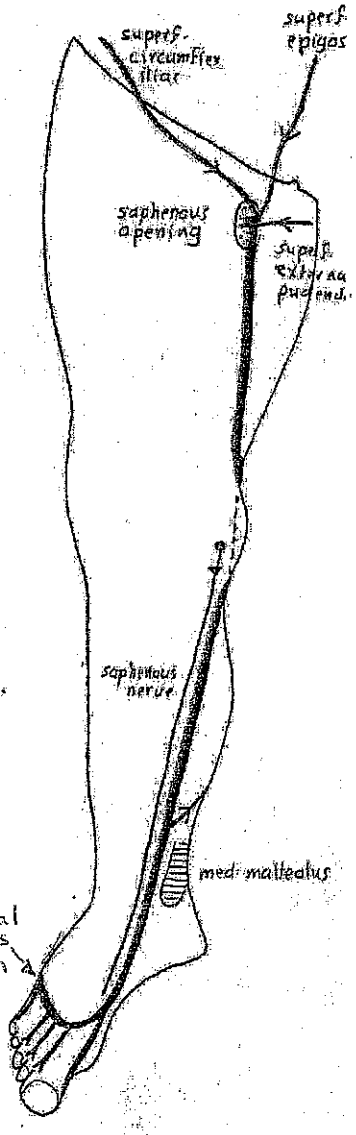
- Begins at lat. border of foot.
- Begins by union of ⟷ dorsal venous arch.
  ⟷ lat. dorsal digital vein of little toe.

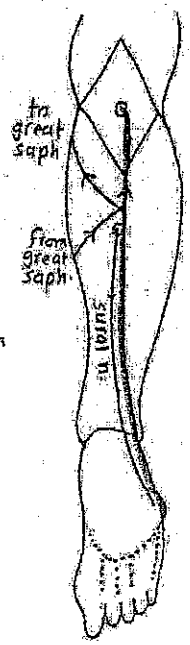
Course & relations

- Behind two heads of gastrocnemius (with sural n.) then in roof of popliteal fossa (where it pierces popliteal fascia.

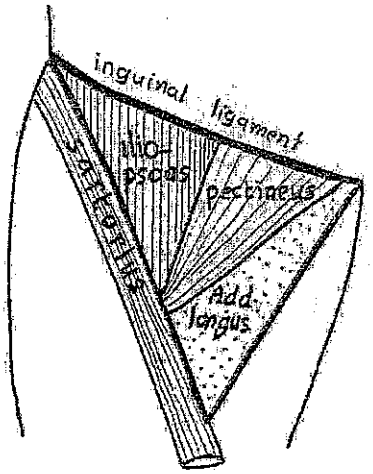
(B) Deep veins.

1) Venae comitantes of ant. & post. tibial arteries.
2) Popliteal vein.
3) Femoral vein.

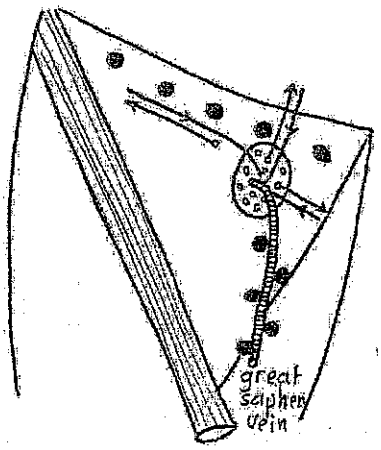




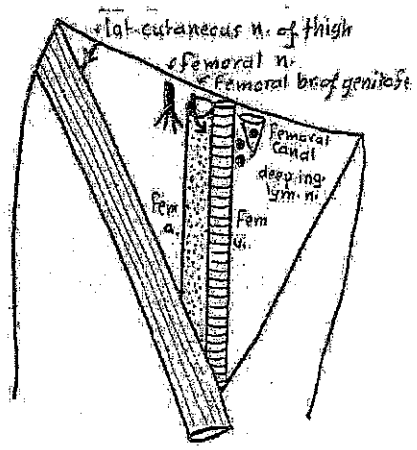
Femoral triangle :



Boundaries + Floor



roof

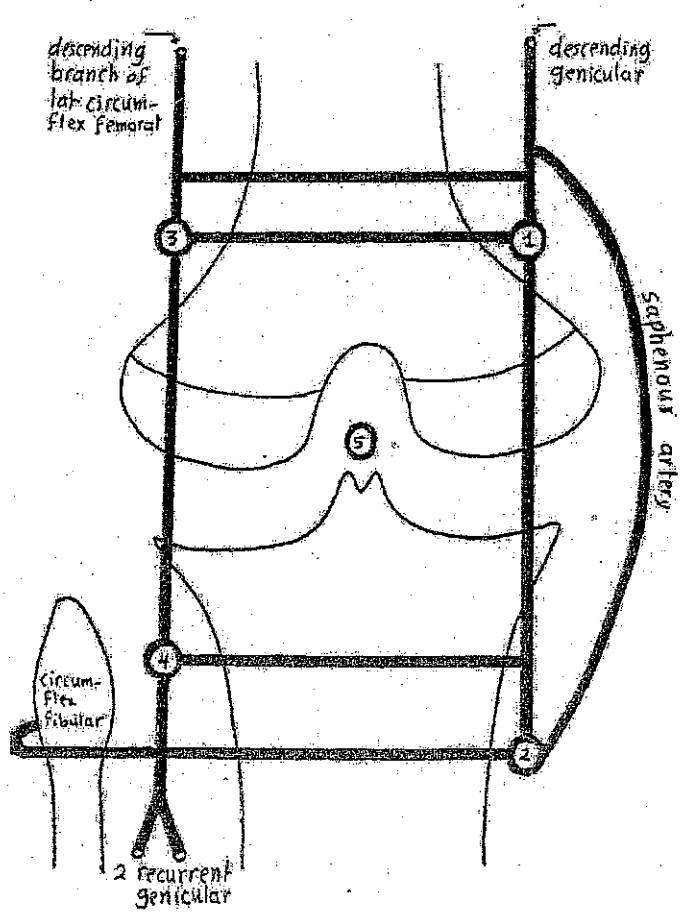


Contents

Anastomosis around Knee : (= arterial supply of knee joint).

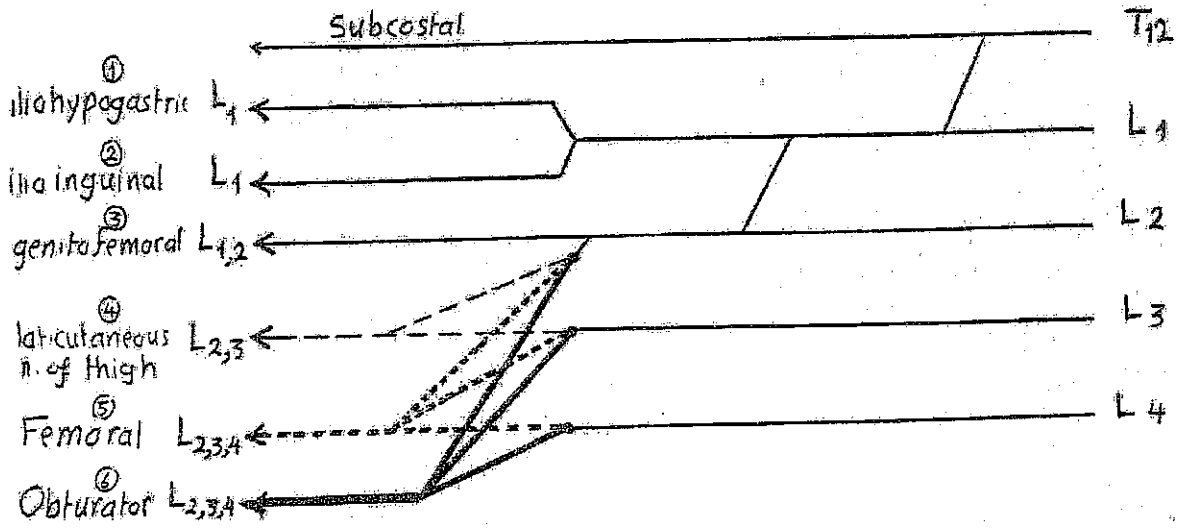
10 arteries coming from :

- Popliteal a.
- Ant. tibial a.
- Femoral a.
- Profunda Femoris a.
- Post. tibial a.



Lumbar plexus:

Formed by ventral rami of lumbar nerves no $L_{1,2,3,4}$.



Branches:

① Ilio-hypogastric n. L_1
- Supplies: - Ant. abdominal wall.
  - Skin above med $\frac{1}{3}$ of inguinal lig.

② Ilio-inguinal n. L_1
- Supplies: - Ant. abdominal wall.
  - Skin below med $\frac{1}{3}$ of inguinal lig + Scrotum.

③ Genito-femoral n.: $L_{1,2}$
Has: . Genital branch:
Supplies: - Cremasteric muscle.
- Skin of scrotum.
. Femoral branch:
supplies: - Skin below middle $\frac{1}{2}$ of ing. lig.

Sciatic nerve:

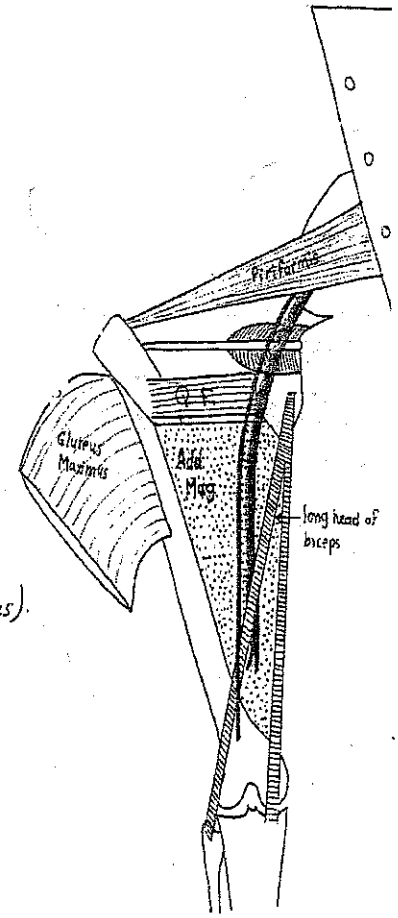
- Root value: - Lat. popliteal part (common peroneal part) $L_{4,5}$ S_{1-2}
  - Med. popliteal part (tibial part): L_{4-5} S_{1-2-3}
- Begins at: pelvis as one of 2 terminal branches of sacral plexus.
- Ends at: Middle of back of thigh (near upper angle of popliteal fossa)
  By: 2 terminal branches: 1) Lateral popliteal n.
  2) Medial popliteal n.

Course & relations:

A] In gluteal region

Appears from greater sciatic foramen below piriformis.

- Relations with nerves:
  - Superficial to it: Post. cut. n. of thigh.
  - Deep to it: n. to quadratus femoris.
- Relations with muscles:
  - Superficial to it: Gluteus maximus.
  - Deep to it: - Sup. gemellus
    - Obturator internus tendon.
    - Inf. gemellus.
    - Quadratus femoris.



B] In back of thigh:

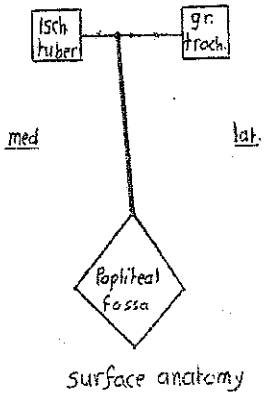
- Descends deep to long head of biceps (on adductor magnus).
- Becomes separated from post. cut. n. of thigh by long head of biceps.

Branches: NO cutaneous branches.

1) Articular: - to hip joint.
2) Muscular: - Hamstrings.
   - Hamstring part of adductor magnus

Surface anatomy:

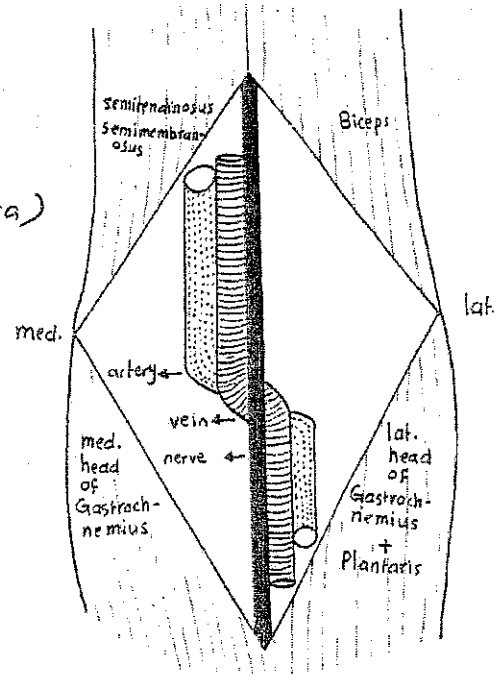
1) Point just med. to mid point between ischeal tuberosity & greater trochanter.
2) Upper angle of popliteal fossa.



surface anatomy

Medial popliteal nerve (Tibial nerve)

- Root value: $L_{4,5}$ $S_{1,2,3}$
- Begins at: Middle of back of thigh (near upper angle of popliteal fossa)
- Ends at: Lower border of popliteal muscle.
- Ends by: becoming post. tibial nerve.



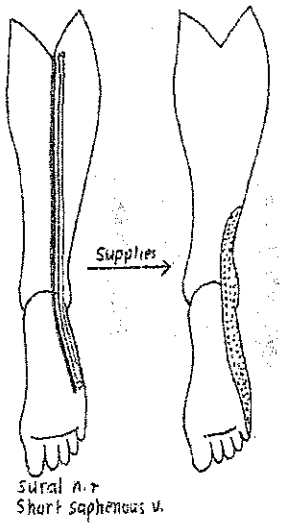
Course & relations:

[A] With walls of popliteal fossa:
- Superficial: Roof of popliteal fossa.
- Deep: Floor of popliteal fossa.
- Laterally: lat. border of popliteal fossa.
- Medially: med. border of popliteal fossa.

[B] With popliteal artery & vein:

Branches:

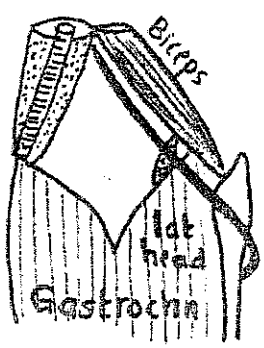
- Articular.
- Muscular: Gastrocnemius, popliteus, Soleus & plantaris (if present).
- Cutaneous: Sural nerve.



Lateral popliteal nerve (common peroneal n.)

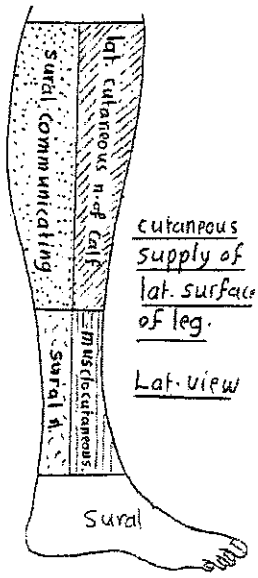
- Root value: $L_{4,5}$ $S_{1,2}$
- Begins at: Middle of back of thigh.
- Ends at: lat. surface of neck of fibula.
- Ends by 2 terminal branches: - Musculocutaneous n.
  - Ant. tibial n.

Course & relations:



Branches:

- No muscular br.
- Articular.
- Cutaneous:
  1) Sural (peroneal) communicating n.
  2) Lat. Cut. n. of calf.



cutaneous supply of lat. surface of leg.

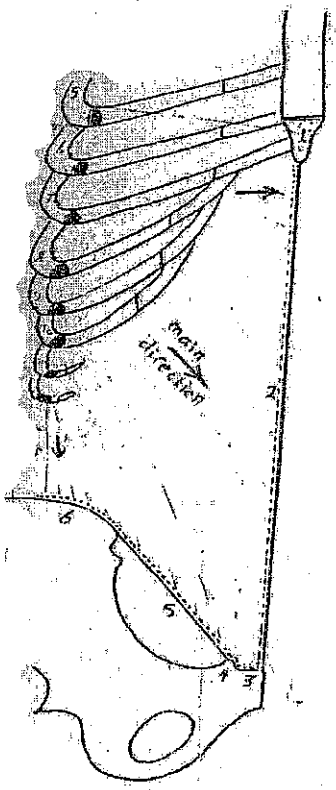
Lat. view

ABDOMEN & PELVIS

Muscles of anterior abdominal wall

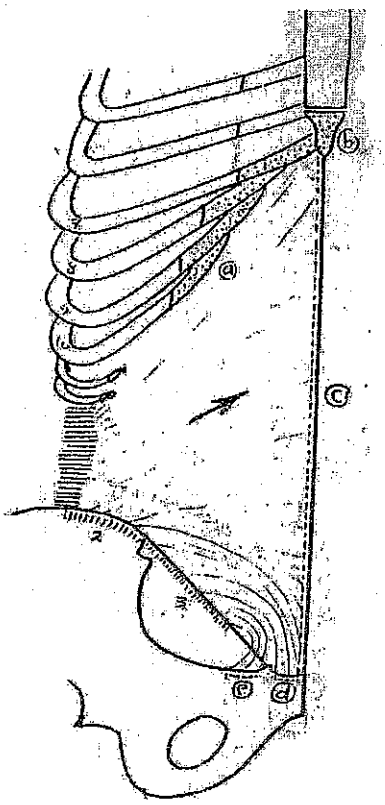
- Each muscle is fleshy near its origin and aponeurotic near insertion.

External oblique



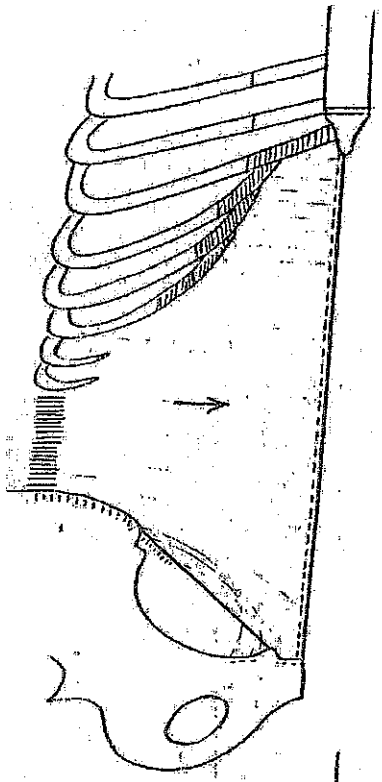
- **Origin:** Lower 8 ribs (at mid axillary line).
  - Interdigitating with: - Serratus ant.
    - Latissimus dorsi.
- **Insertion:** ① Xiphoid cartilage.
  ② Linea alba
  ③ Pubic crest.
  ④ Pubic tubercle
  ⑤ Inguinal ligament.
  ⑥ Iliac crest (ant ½).
- **Direction:** Downwards, forwards & medially.

Internal oblique



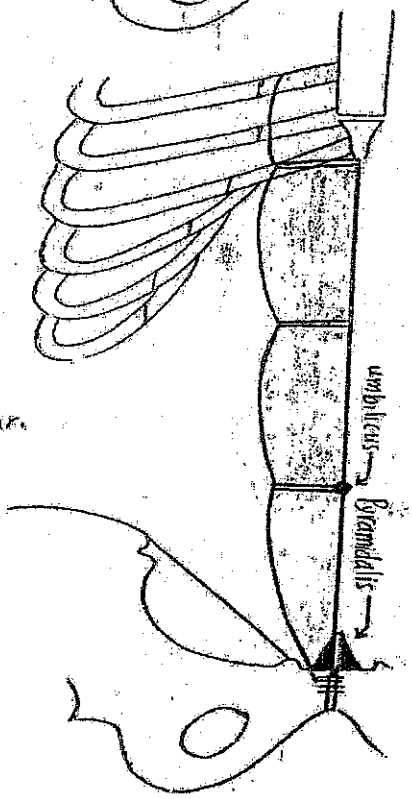
- **Origin:** ① Lumbar fascia.
  ② Iliac crest (ant ½).
  ③ Inguinal ligament (lat ⅔).
- **Insertion:**
  ⓐ Lower 6 costal cartilages.
  ⓑ Xiphoid cartilage.
  ⓒ Linea alba.
  ⓓ Pubic crest.
  ⓔ Pectineal line.
- **Direction:** Upwards, Forwards & medially.

Transversus abdominis



- **Origin:** ① Lower 6 costal cartilages.
  ② Lumbar fascia.
  ③ Iliac crest (ant ⅔).
  ④ Inguinal ligament (lat ⅓).
- **Insertion:** ⓐ Xiphoid cartilage.
  ⓑ Linea alba.
  ⓒ Pubic crest.
  ⓓ Pectineal line.
- **Direction:** transverse.

Rectus abdominis



- **Origin:** ① Pubic crest.
  ② Ant. pubic ligament.
- **Insertion:** ① Costal cartilages 5, 6, 7.
  ② Xiphoid cartilage
  - Its lateral border is called → Linea semilunar.
  - It has 3 (or 4) tendinous intersections.
  - It is surrounded by rectus sheath.

Nerve supply of ant. abd. wall muscles:

Lower 5 intercostal nerves + subcostal n + : ↓
Conjoint tendon : by L_1 (i.e. by ilio hypogastric).
Cremasteric muscle : by genital branch of genito-femoral n.

Action of ant. abd. wall muscles:

1) Evacuation of abdominal viscera (by contraction with diaphragm).
2) Protection of abdominal viscera.
3) Forced expiration.
4) Forward flexion
5) Lateral "
6) Rotation

→ of the trunk.

Rectus sheath:

- Formation:

Ⓐ Above costal margin:

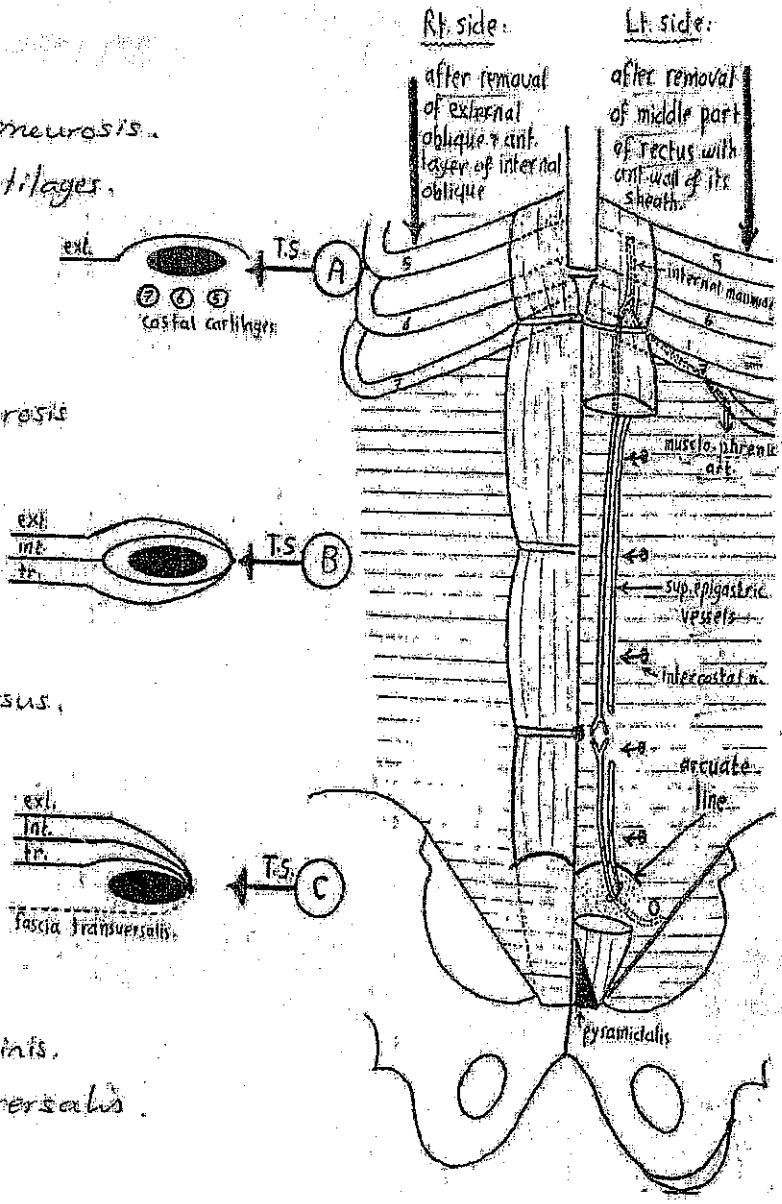
- ant.: external oblique aponeurosis.
- Post.: 5th, 6th, 7th costal cartilages.

Ⓑ Between costal margin & arcuate line:

- ant.: - External oblique aponeurosis
  - Ant. layer of internal oblique aponeurosis.
- post.: - posterior layer of intern oblique aponeurosis.
  - Aponeurosis of transversus.

Ⓒ Below arcuate line:

- ant.: aponeuroses of:
  - Ext. oblique.
  - Int. oblique.
  - Transversus abdominis.
- Post.: - Only fascia transversalis.



Arcuate line:

- Sharp curved lower borders of post. wall of rectus sheath.
- Site: mid way between umbilicus & symphysis pubis.

Contents: 2 muscles: < Rectus abdominis, Pyramidalis.

2 Arteries: < Sup. epigastric (br. from internal mammary artery), inf. epigastric (branch from external iliac artery).

2 veins: < Sup. epigastric, inf. epigastric.

6 nerves: < Lower 5 intercostal nerves, Subcostal nerve.

Inguinal Ligament:

- It has 4 parts:

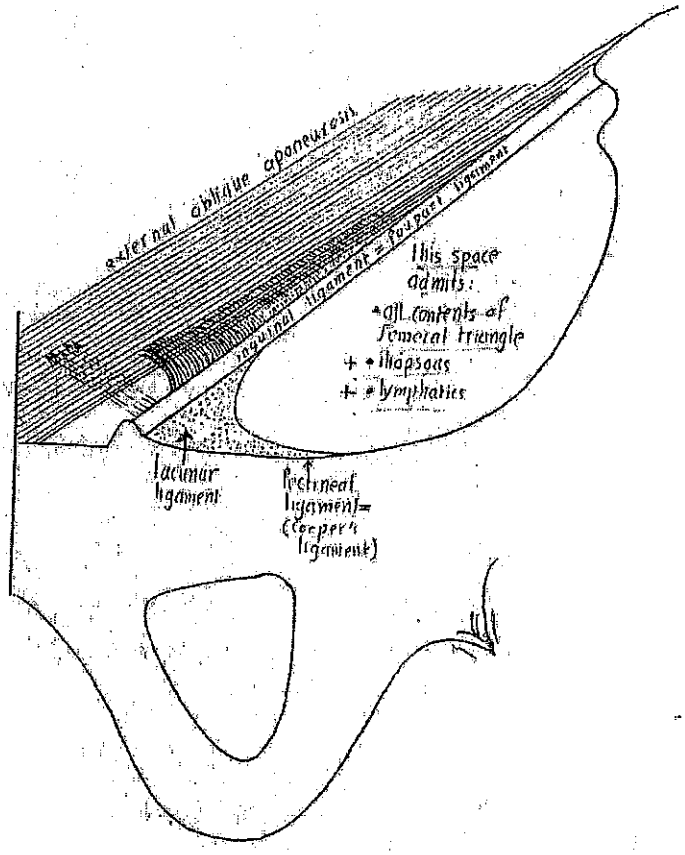
a) Inguinal ligament proper:

- Attached to ↗ ASIS
  ↘ pubic tubercle

- Attached to it:

3 muscles: - external oblique
- internal oblique
- transversus abdominis.

2 fasciae: - Fascia lata
- fascia transversalis.



b) Lacunar ligament:

c) Pectineal ligament.

d) Reflected ligament.

Inguinal canal:

- Length: 1½ inches.

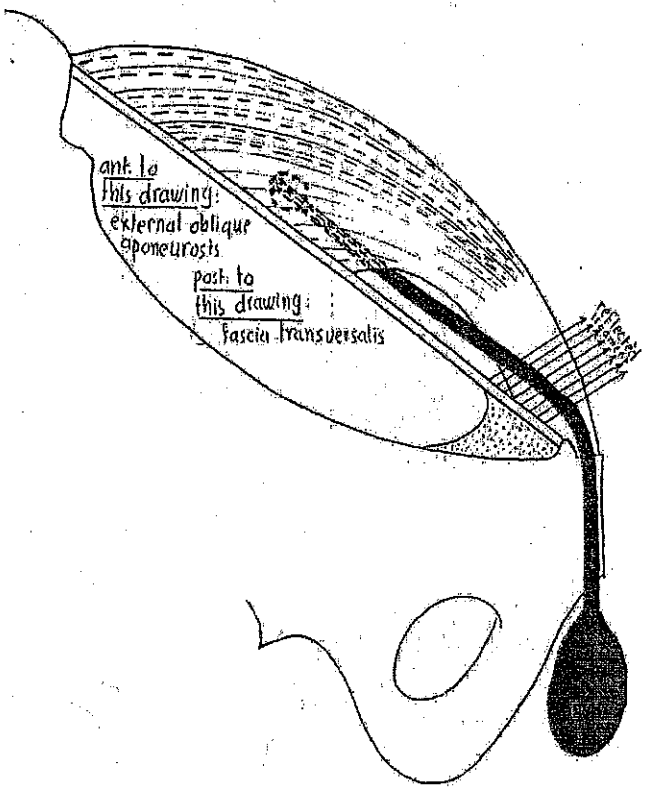
- It is parallel & above med ½ of inguinal ligament.
- Ends laterally at deep inguinal ring.
- End medially at superficial inguinal ring.

- Contents:

- In ♂: Spermatic cord.
- In ♀: Round lig. of uterus.

- Walls of inguinal canal (relations):

- Ant: - External oblique aponeurosis.
  - Internal oblique muscle.
- Post: - Reflected lig.
  - Conjoint tendon. (med only)
  - Fascia transversalis.
- Sup.: - Arching fibers of int. oblique.
- Inf.: - Inguinal ligament.



Spermatic cord:

▪ Contents of spermatic cord:

1- Vas deferens
   Remnants of processus vaginalis.

2- Arteries of testis:
   - testicular artery (from aorta).
   - Cremasteric (from inf. epigastric).
   - Ar. of vas (from inf. vesical).

3- Nerves of testis:
   - Testicular plexus around testicular artery.
   - Diferential plexus around vas & its artery.
   - Genital branch of genito-femoral nerve.

4- Veins of testis:
   - Pampiniform plexus.

● Coverings of spermatic cord:

1- External spermatic fascia. (From external oblique aponeurosis).
2- Cremasteric muscle & fascia (From internal oblique muscle).
3- Internal spermatic fascia (From fascia transversalis).

● Coverings of testis:

- 3 From scrotum.

1. Skin
2. Dartos muscle
3. Colle's fascia.

- 3 From ant. abd. wall

1. External spermatic fascia.
2. Cremasteric muscle & fascia.
3. Internal spermatic fascia.

- 3 capsules of testis.

1. Tunica vaginalis (Parietal layer).
2. Tunica vaginalis (Visceral layer).
3. Tunica albuginea (Fibrous capsule).

● Layers of scrotum:

1- Skin.
2- Dartos muscle.
3- Colle's fascia.
4- Ext. spermatic fascia.
5- Cremasteric ms & fascia.
6- Internal spermatic fascia.
7- Parietal layer of tunica vaginalis.

Arteries of ant. abdominal wall:

A Superficial:

- 3 superficial branches of femoral artery:
  1- Superficial epigastric artery.
  2- Superficial circumflex artery.
  3- Superficial external pudendal artery.

B Deep:

1- Sup. epigastric artery:
One of 2 terminal branches of internal mammary artery.

2- Musculo-phrenic artery:
One of 2 terminal branches of internal mammary artery.

3- Inferior epigastric arteries:
Branch from external iliac artery.

Fascia of anterior abdominal wall:

A Superficial fascia:

1- Superficial fatty layer (Camper's fascia).
2- Deep membranous layer (Scarpa's fascia).

B Fascia transversalis: Lines transversus abdominis.

Nerve supply of ant. abdominal wall.

[A] Lower 5 intercostal nerves.

[B] Sub costal nerves.

[C] Iliohypogastric nerve + ibioinguinal nerves: (= L1).

[D] Genito-femoral nerve (L1, 2).

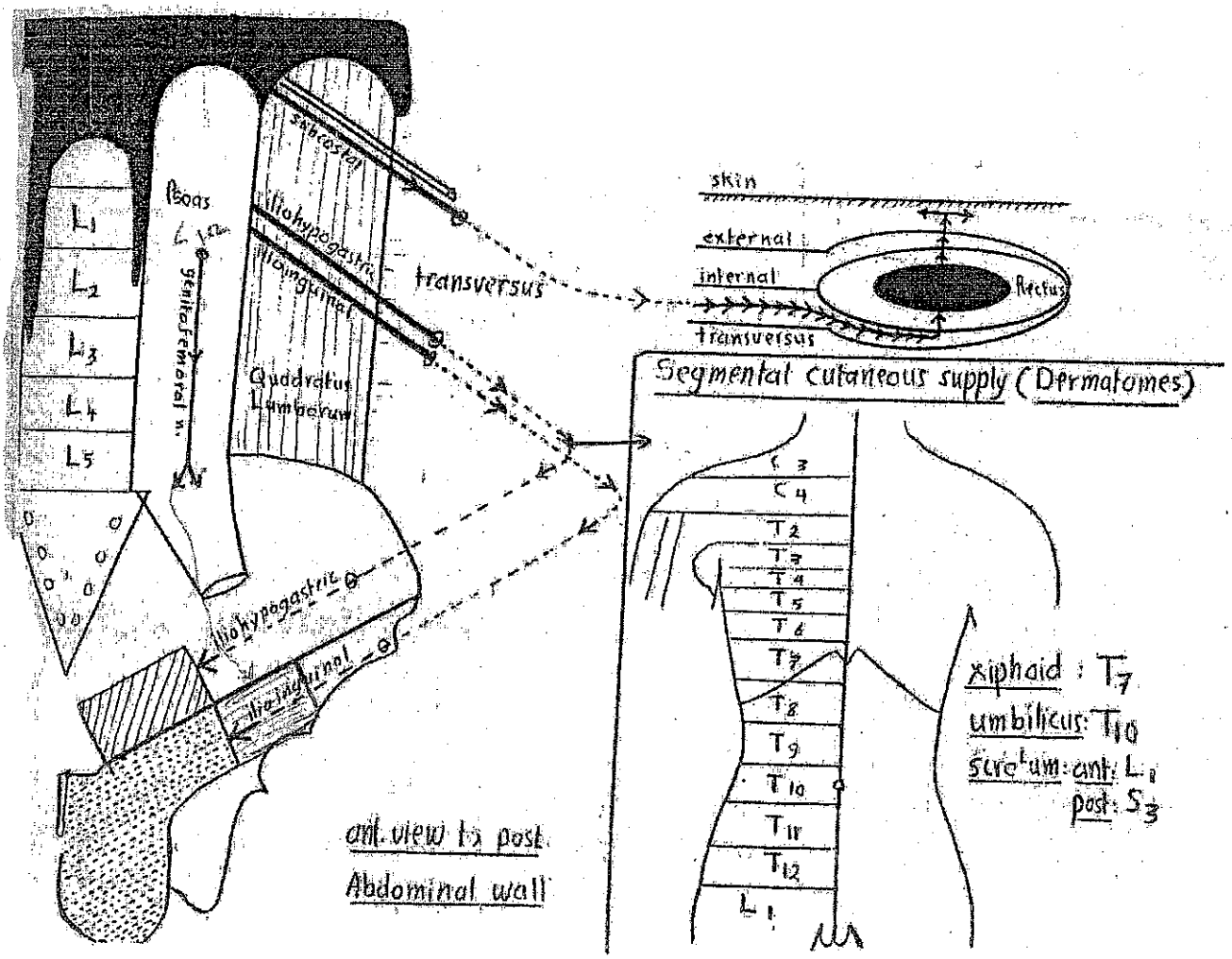
- Divides into :

1) Genital branch :

- Supplies: - Skin of scrotum (anteriorly).
  - Cremasteric muscle.

2) Femoral branch :

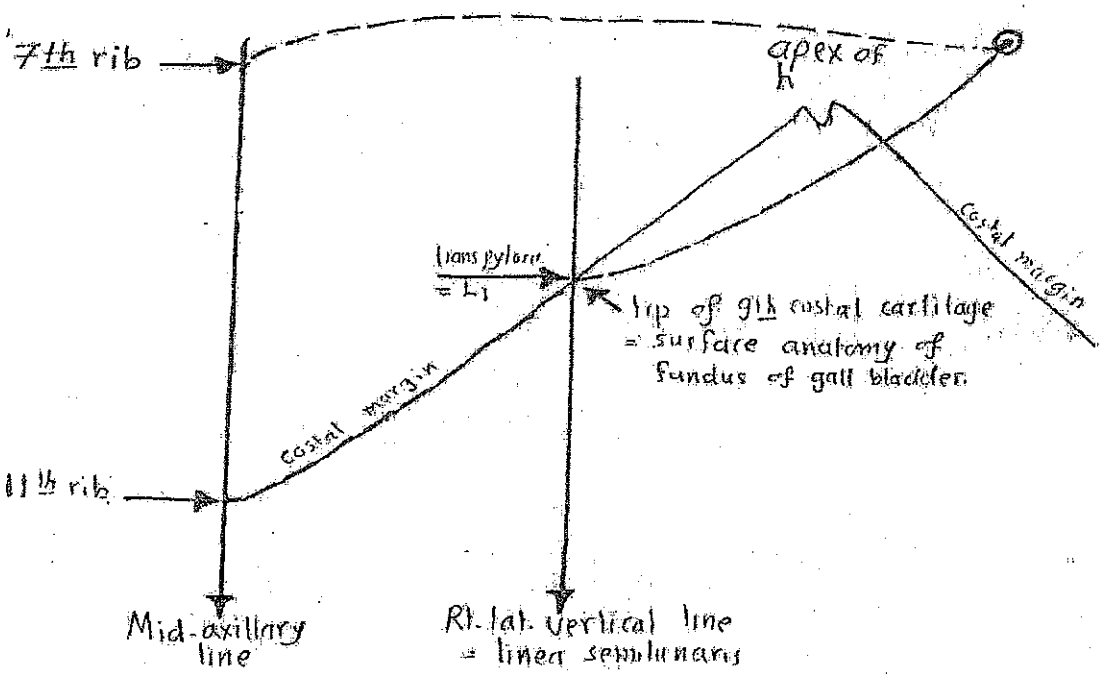
- Supplies: - Skin below middle 1/3 of inguinal ligament.



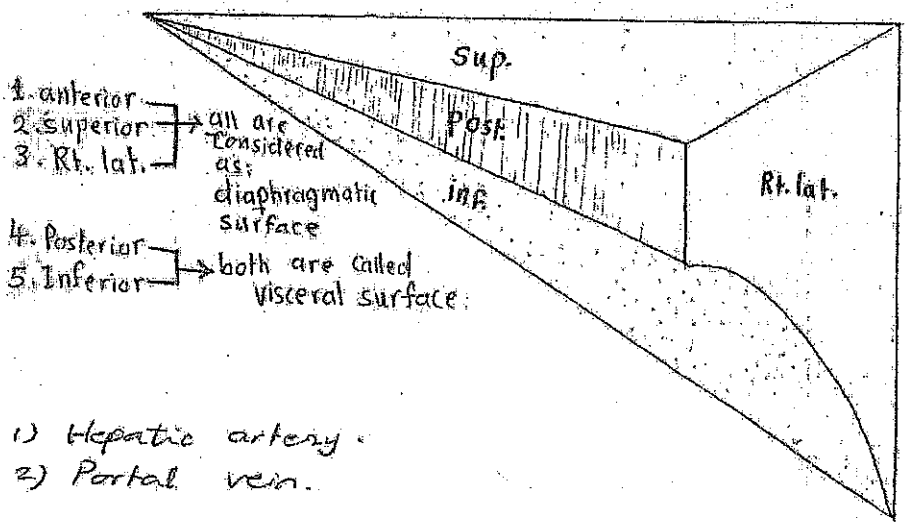
Liver

Surface anatomy:

- Sup. border: line connecting 2 points:
  1) Apex of the heart (5th intercostal space, 9 cm from middle line)
  2) Meeting of mid-axillary line & 7th rib.
- Right border: Mid axillary line between ribs 7, 11.
- Inferior borden: line connecting 3 points:
  1) Apex of the heart.
  2) Tip of 9th costal cartilage.
  3) Meeting of mid axillary line & 11th rib.


7th rib
apex of heart
Costal margin
Trans pyloric = L_1
Tip of 9th costal cartilage = surface anatomy of fundus of gall bladder
Costal margin
11th rib
Mid-axillary line
Rt. lat. vertical line = linea semilunaris

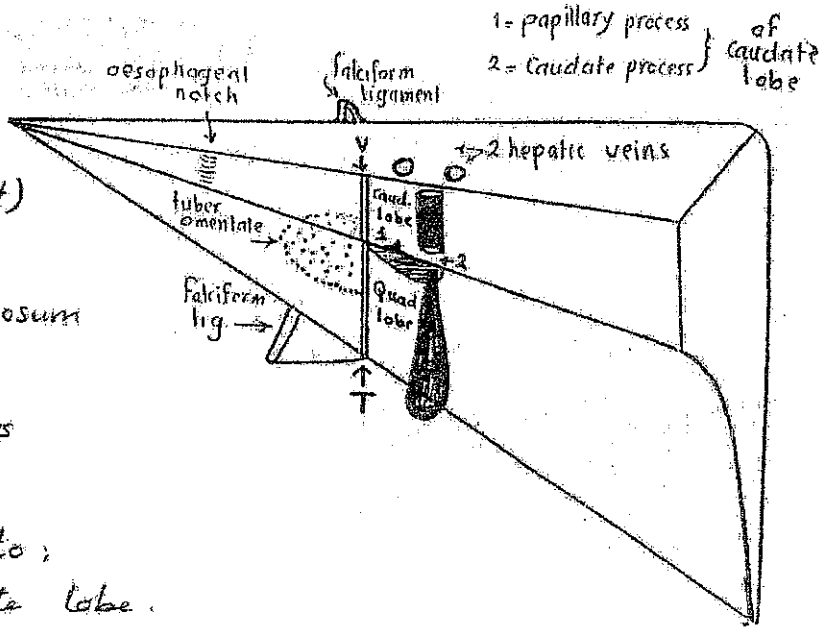
5 Surfaces:



Blood supply: 1) Hepatic artery.
2) Portal vein.

Nerve supply: 1) Coeliac plexus.
2) Gastric nerves.

Lobes of Liver:



[A] Anatomically :

- Liver is divided by:

1. Falciform ligament (ant)
2. 2 fissures :
   - Fissure for ligamentum venosum on post. surface.
   - Fissure for ligamentum teres on inferior surface.

** ① & ② divide liver into:

- Right lobe: a) Caudate lobe.
  b) Quadrate lobe.
- Left lobe:

has : - tuber omentale.
- 1 groove: oesophageal notch (on post. surface).
- 2 impressions: . Cardiac impression (on sup. surface).
  . Gastric impression (on inf. surface).

[B] Surgically (according to blood supply):

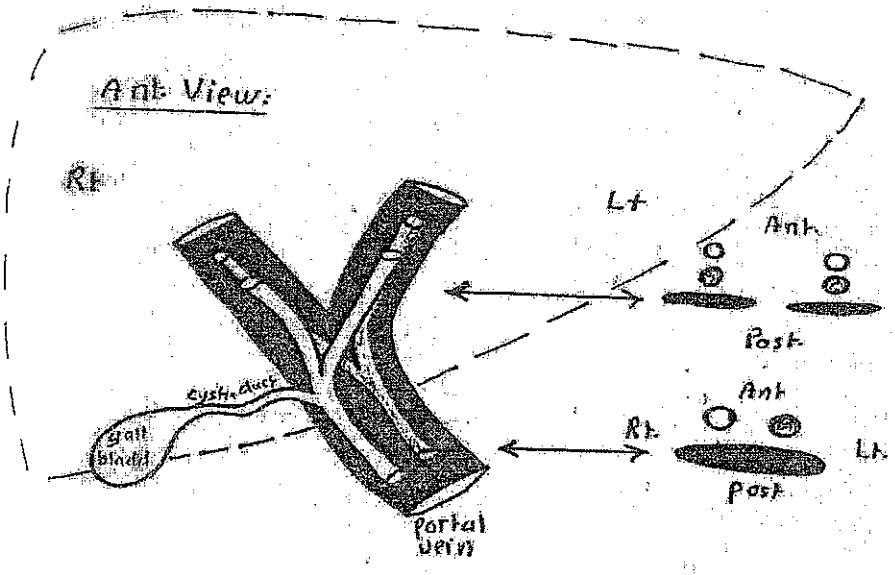
It is divided by line passing through : IVC & gall bladder
i.e. surgically caudate & quadrate lobes are parts of the Lt lobe. and not of Rt. ~~lobe~~.

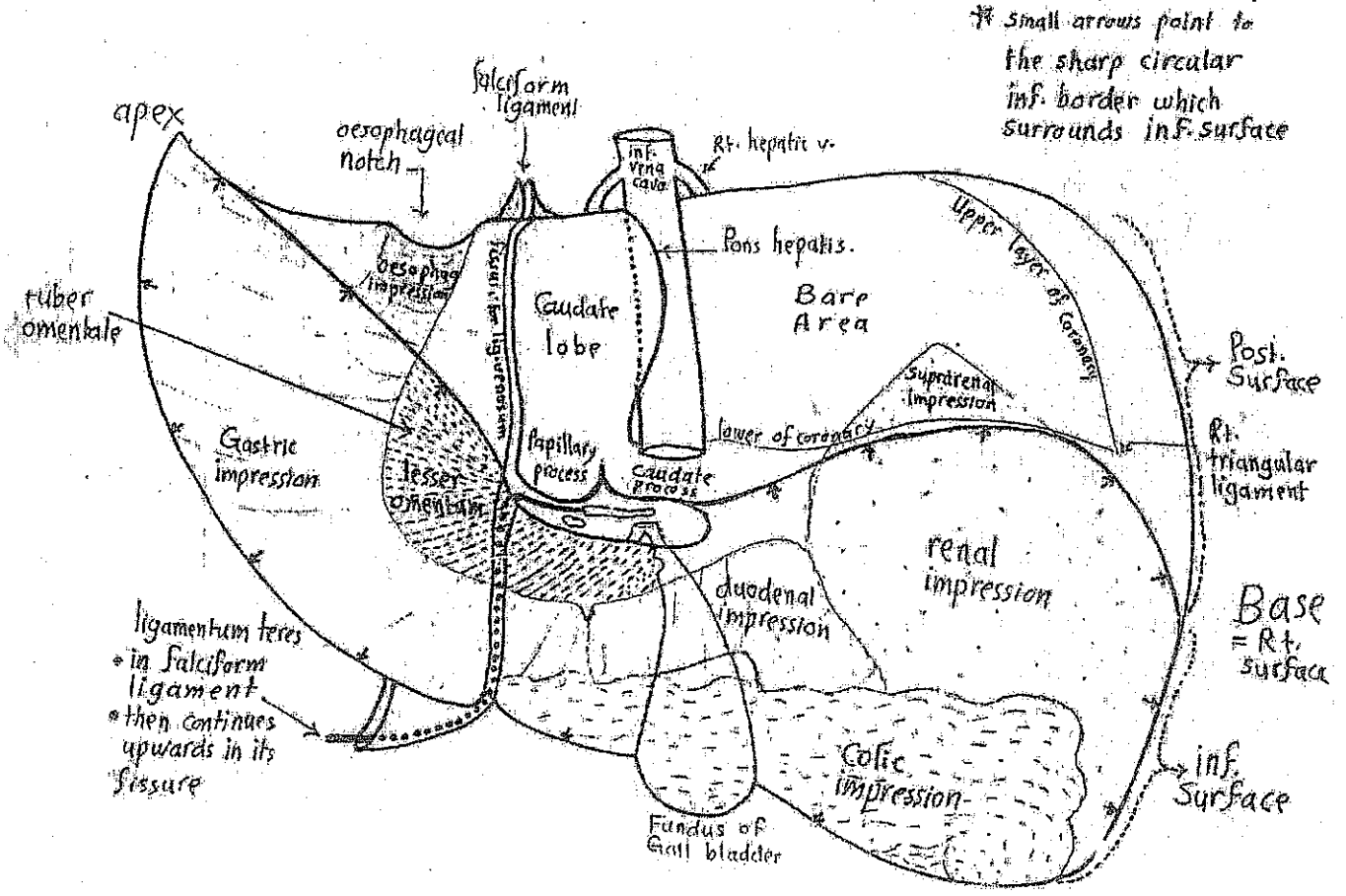
[N.B.]: Right lobe (anatomically) has also the following:

- 4 impressions : Renal, supra renal, colic, duodenal.
- Pons hepatis : elevated Lt margin of inf. vena caval groove.

- Porta hepatis : = Hiatus of the liver.

Arrangements of the contents:

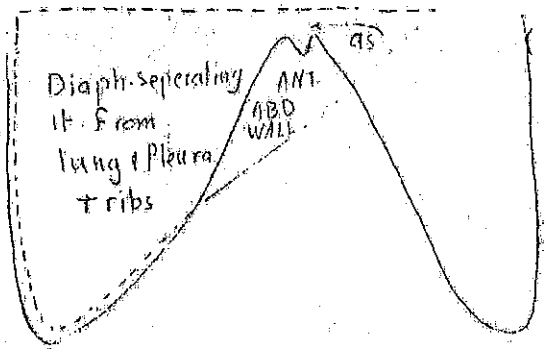




Relations:

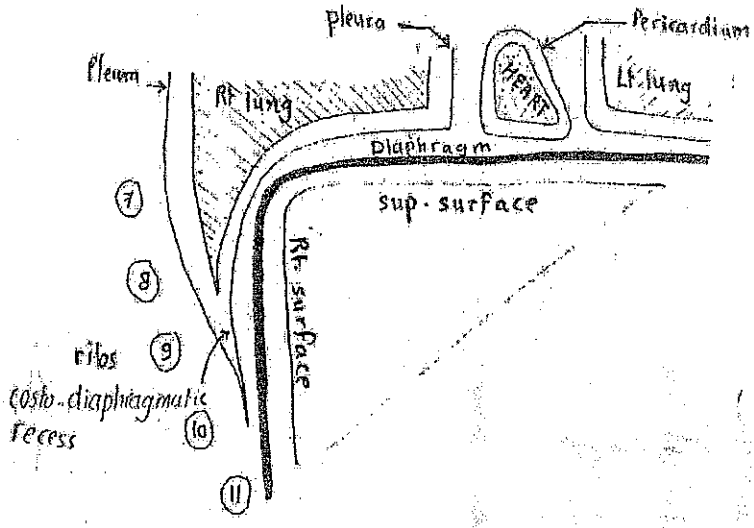
A- Diaphragmatic surface includes:

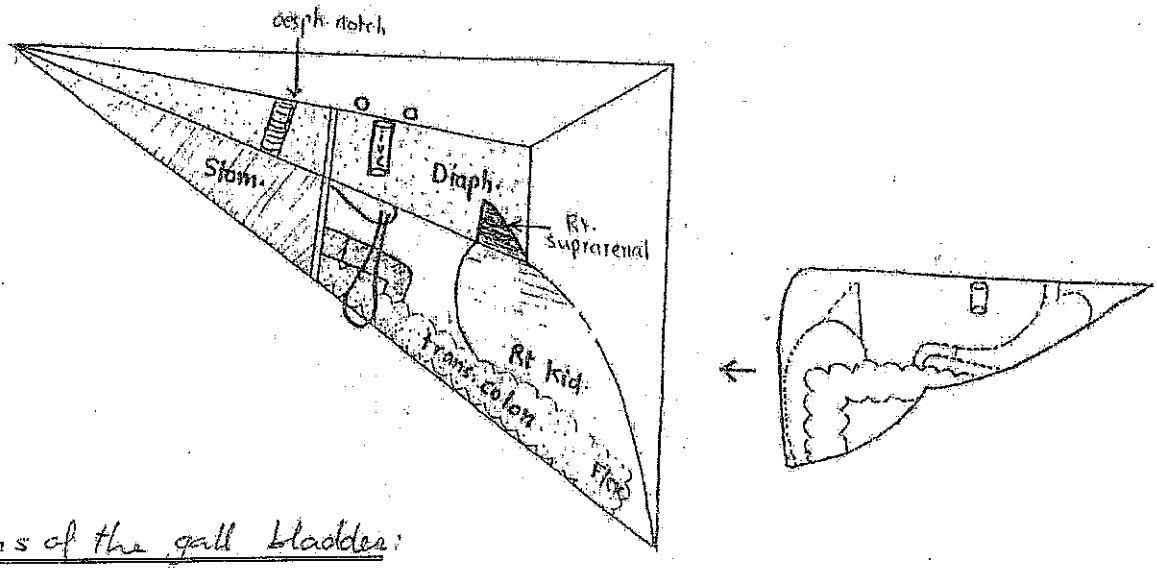
- Ant. surface:
  - Diaphragm then lungs & pleura & ribs.
  - Ant. abd. wall.
- Sup. surface:
  - Diaphragm, then lungs & pleura & heart.
- Rt surface:
  - Diaphragm separating liver from:
    - Rt lung & pleura, then 7th & 8th ribs.
    - Costo-diaphragmatic recess, then rib 8
    - 10th space & 11th rib.



B- Visceral surface includes:

- Post. surface:
  - Diaphragm + ① Oesophagus
    ② IVC
    ③ Rt suprarenal.
- Inf. surface:
  - [1] Lt lobe: Stomach & lesser omentum
  - [2] Quadrate lobe:
    - lesser omentum (ant.).
    - Pyloro-duodenal junction (middle).
    - Transverse colon (post).
  - [3] Rest of Rt. Lobe:
    - Duodenum (1st & 2nd parts).
    - Transverse colon & Lt flexure.
    - Rt Kidney.





Relations of the gall bladder:

- Post: 1) Duodenum (above) 2) Transverse colon (below).
- Ant: 1) Liver (above). 2) Ant. abd. wall (only related to Fundus).

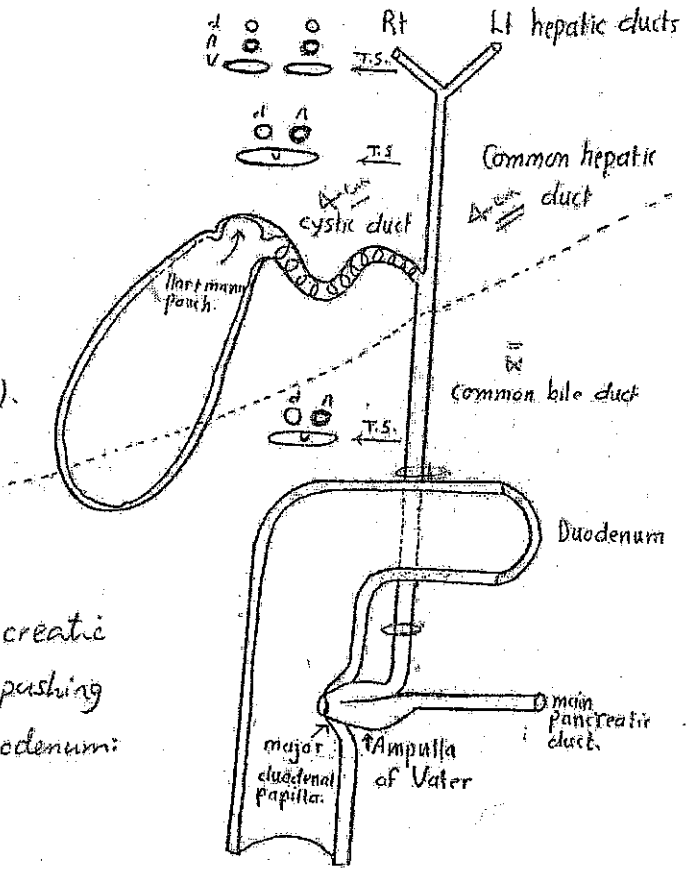
Biliary system:

1) Right & left hepatic ducts.
2) Common hepatic duct (4 cm).
3) Cystic duct (4 cm).
4) Common bile duct (4 inches):

→ 4 parts:

a- In porta hepatis (very small part).
b- In free border of lesser omentum.
c- Behind 1st part of duodenum.
d- Behind head of pancreas.

- Then it unites with the main pancreatic duct forming: "Ampulla of Vater", pushing mucasa at middle of 2nd part of duodenum: "Major Duodenal Papilla".



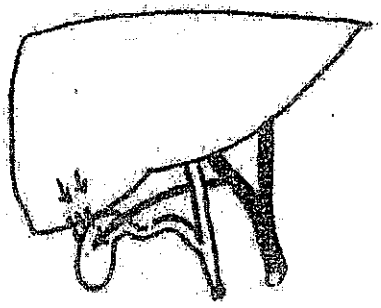
5) Gall bladder:

- Surface anatomy: "of fundus"
  - At tip of 9th costal cartilage. OR:
  - At meeting of:
    - Costal margin with:
      - Linea semilunaris with
      - trans pyloric plane (L1).

- Arterial supply:

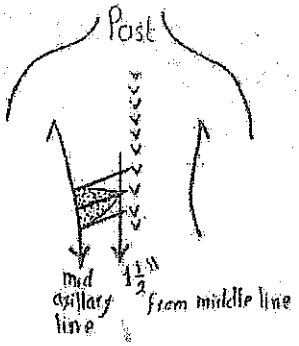
① Cystic artery: from Rt hepatic artery:
Passes in "Calot's triangle" between:

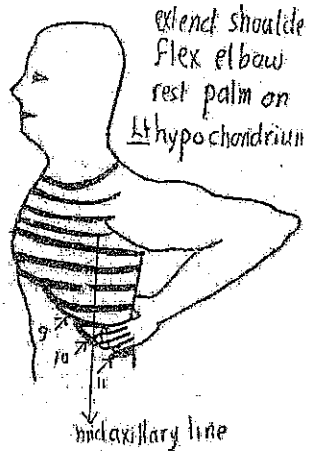
- liver
- cystic duct
- Common hepatic duct.



② Many small arterioles: from its bed in Liver.

Spleen



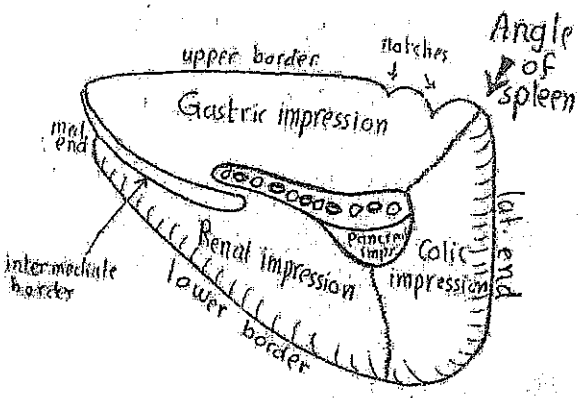


Surface anatomy:

- In Lt hypochondrium.
- Sup- border: along 9th rib.
- Inf. border: along 11th rib.
- Lat (ant) end: along mid axillary line.
- Med (post) end: 1½" lateral to spine no T10

Spleen has:

- 2 Surfaces: - Diaphragmatic, visceral.
- 2 Borders: - Upper (sharp & notched).
  - Lower (Rounded).
- 2 ends: - Lateral (= ant).
  - Medial (= post).



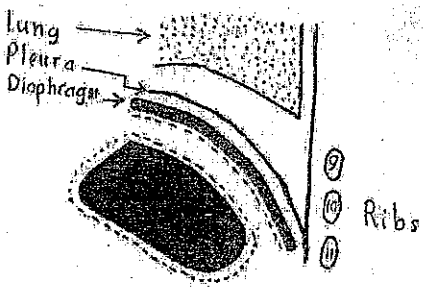
Relations:

A] Visceral surface:

1. Stomach 2. Lt kidney
3. Lt colic flexure 4. Tail of pancreas.

B] Diaphragmatic surface:

- Covered with peritoneum, then diaphragm, then ribs no 9, 10, 11



Peritoneum of spleen:

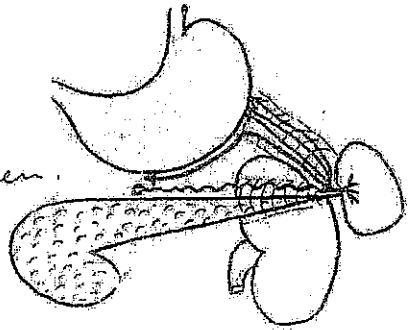
2 Peritoneal ligaments:

1) Icino-renal ligament:

From: hilus of spleen To: Ant. surface of Lt kidney.
Contains: - Tail of pancreas.
- Splenic vessels.

2) Gastro-splenic ligament:

From: body of stomach To: hilus of spleen.
Contains: - short gastric vessels.
- Lt gastro-epiploic vessels.



- Arterial supply: Splenic artery.
- Venous drainage: Splenic vein.
- Spleen has NO lymph drainage.

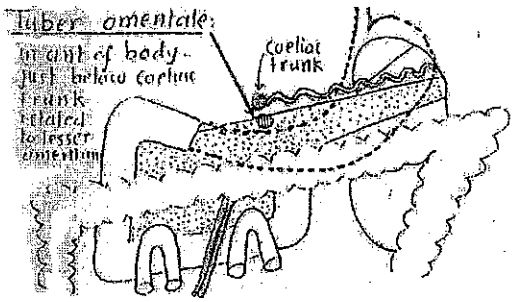
■ Causes of notches:

indicate lobular origin of spleen in fetus.

Organs without lymph drainage:

- Brain, eyes, spleen, bone marrow.
- Hair, nail, epidermis
- Articular cartilages.

Pancreas



- **Head:** - In concavity of duodenum.
  - Has uncinate process.

Relations:

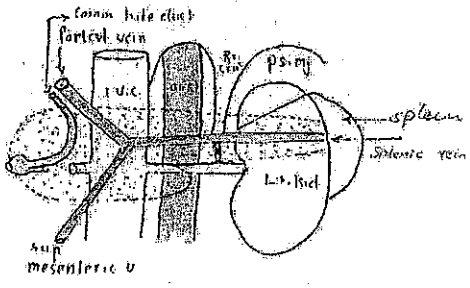
Ant: - Small intestine
- Transverse colon
- 1st part of duodenum.

Post: - Veins: - Portal vein
- IVC
- 2 renal veins.

- Duct: CBD.

NB → Sup. mesenteric vessels: ↳ Deep to head
↳ Superf. to uncinate process.

Ant. relations:



Post. relations

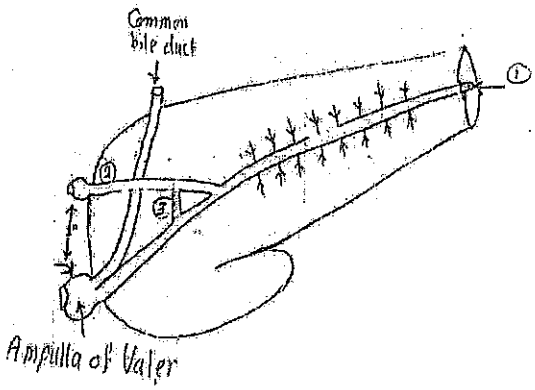
- **Neck:** Identified by:
  - Ant to it: - Junction bet. pylorus & duodenum
    - Gastro-duodenal artery.
  - Post to it: - Junction between splenic v. & sup. mesentric v. to form portal vein.

- **Body:** - Ant.: related to: stomach & transvers colon.
  - Post: related to: - Splenic vein + aorta.
    - Lt crus + Lt psoas major.
    - Lt kidney + Lt renal vessels.

NB → Splenic artery runs along its upper border.

- **Tail:** - In lieno-renal ligament.
  - Touches hilum of spleen.

- **Ducts:**
  - ① Main pancreatic duct (of Wirsung).
  - ± ② Accessory pancreatic duct. (of Santorini).
  - ± ③ Communicating duct: connects ① & ②

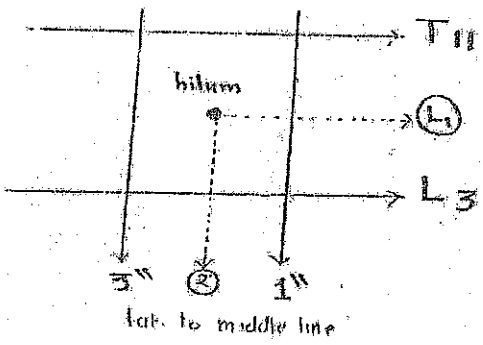


Arterial supply:
1) Pancreatic branch of splenic artery.
2) Sup. pancreatico-duodenal artery.
3) Inf. pancreatico-duodenal artery.

Kidney:

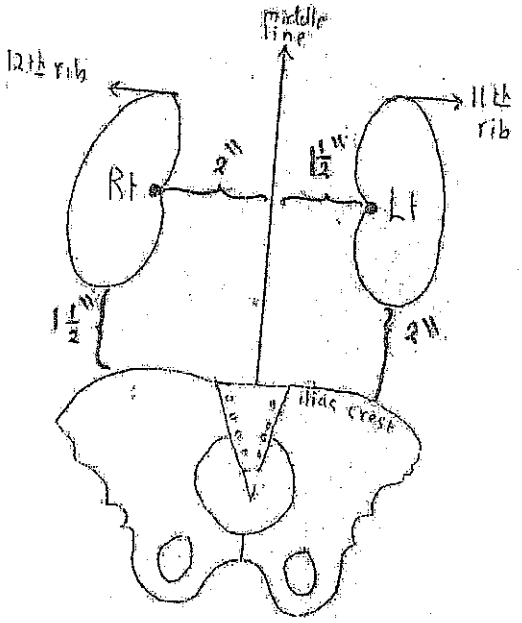
Dimentions: $4\frac{1}{2} \times 2\frac{1}{2} \times 1\frac{1}{2}$

- Surface anatomy:



- There is slight differences between Rt & Lt.
- Lymphatic drainage:

  To hilar LNs, then to para-aortic LNs.



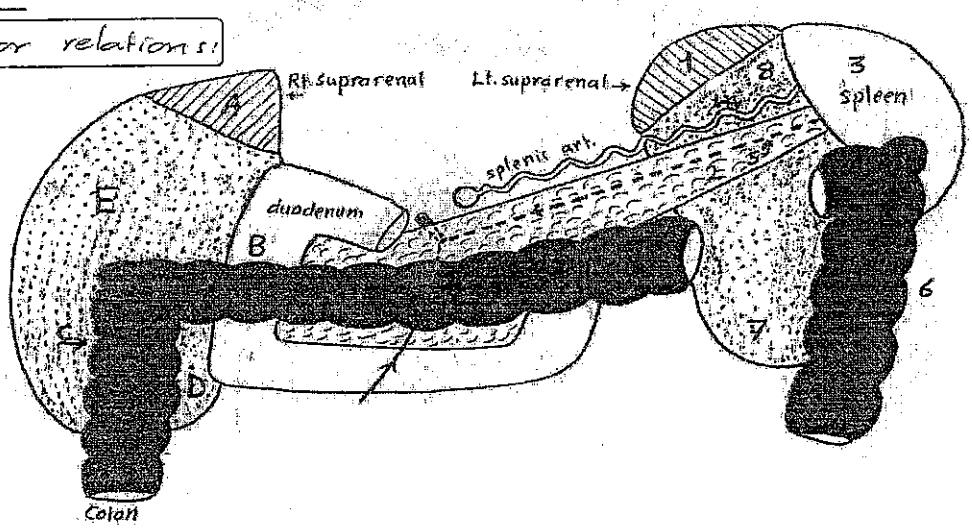
- Hilus: (VAP).
  - Renal vein (ant).
  - Renal artery (at middle).
  - Renal pelvis (post).

- Blood supply: (Renal artery from aorta, renal v. to I.V.C).
  - Arteries: Renal arteries: - Rt is longer.
    - Lt is shorter.
  - Veins: Renal veins: - Lt is longer.
    - Rt is shorter.

- Coverings of the kidney:
  1. Fibrous capsule.
  2. Perirenal fat.
  3. Renal fascia = Zucker candle fascia.
     = incomplete coat around perirenal fat.
  4. Pararenal fat.
  5. Peritoneum.

Relations:

- Anterior relations:



• Of Rt kidney:

A - Rt suprarenal gland.
B - Duodenum (2nd part.).
C - Rt colic flexure.
D - Peritoneum + small intestine.
E - Peritoneum + Liver.

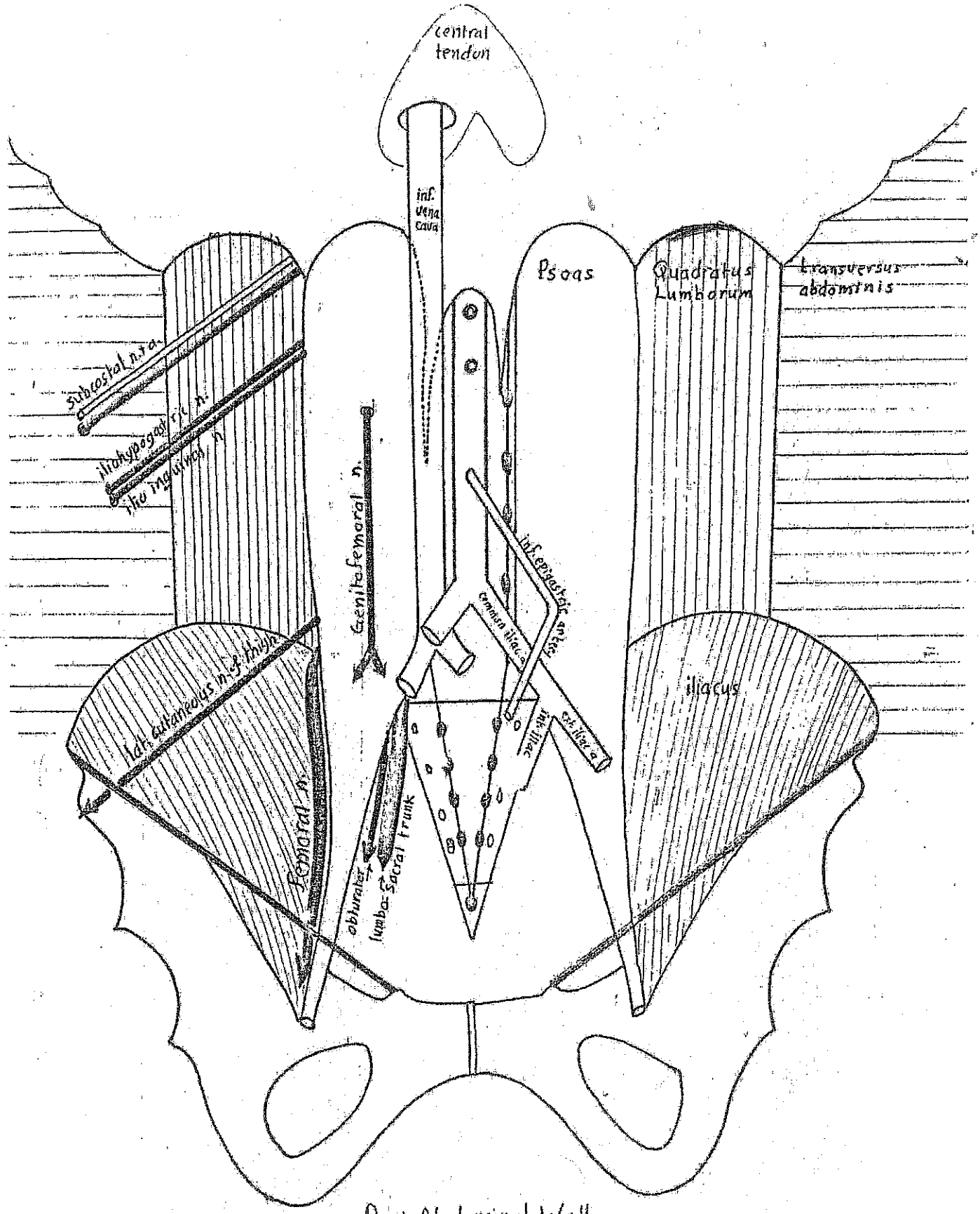
• Of Lt kidney:

1 - Lt suprarenal gland.
2 - Pancreas (body & tail).
3 - Spleen.
4 - Splenic artery.
5 - Splenic vein.
6 - Descending colon.
7 - Peritoneum + Small intestine.
8 - Peritoneum + Stomach.

- Posterior relations: = Renal bed.

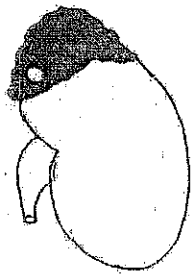
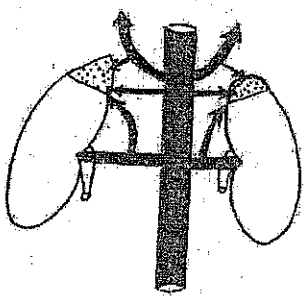
1 Artery : Subcostal artery (as its n.).
2 Ribs : (on Rt : one only) 11th, 12th (behind diaphragm).
3 Nerves: - Subcostal n.
- ilio-hypogastric n.
- ilio-inguinal n.
4 Muscles: - psoas major (med).
- Quadratus lumborum.
- Transversus abdominis (lat.).
- Diaphragm (sup).

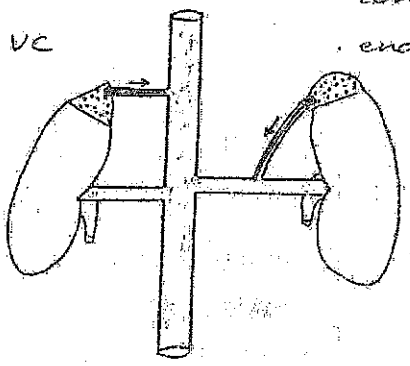
DIAPHRAGM



Post. Abdominal Wall

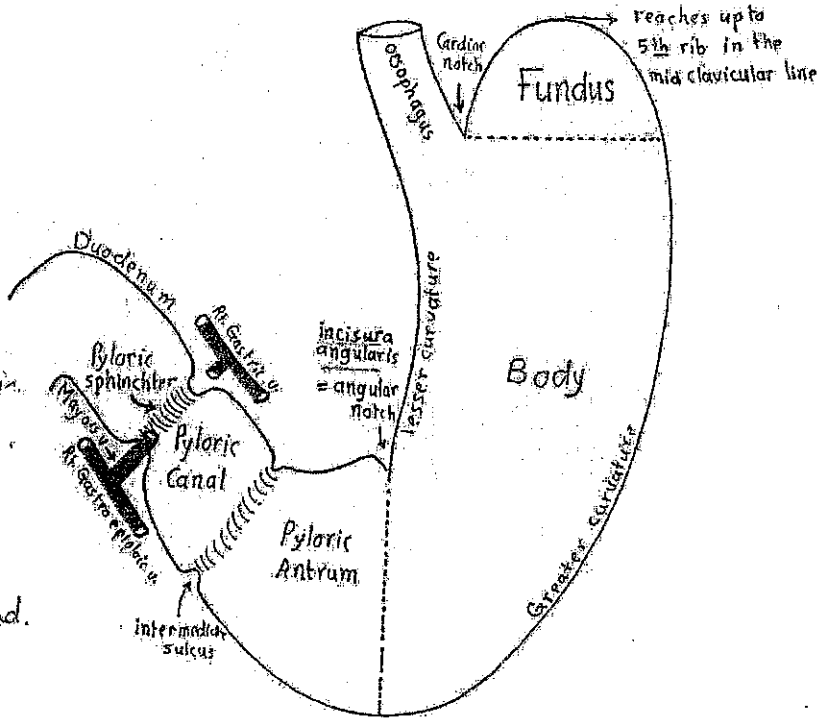
Supra-renal glands:

	Rt suprarenal	Lt suprarenal
Shape	. Pyramidal	. Semilunar. 
Hilus	. Sup (near upper pole) = site of exit of vein.	. Inf (lower medial). = site of exit of vein.
Relations:		
. Ant:	. Liver & IVC	. Stomach.
. Post:	. Kidney . Diaphragm (Rt crus)	. Kidney . Diaphragm (Lt crus).
Arteries:	. Sup. suprarenal a. (from inferior phrenic . Middle suprarenal a. (from aorta). . Inf. suprarenal a (from renal artery). 	
Veins:	1 suprarenal vein: (leaves hilus) which is short. . ends in IVC	1 suprarenal vein (leaves hilus) which is long . ends in Lt renal vein.



Stomach

- At pyloro-duodenal junction:
  1- Annular constriction.
  2- Thick sphincter.
  3- Mayo's vein = pyloric vein
     . between → Rt gastric vein
               → Rt gastro-epiploic vein.
     . Passes ant. to pyloric sphincter.



- Stomach has 2 ends:
  . Cardiac end. . Pyloric end.

- Arterial supply:
  1- Rt & Lt gastric arteries.
  2- Rt & Lt gastro-epiploic arteries.
  3- Short gastric arteries: "From splenic a. & Lt gastro-epiploic a."

- Venous drainage: As arteries.
- Nerve supply: - Para sympathetic: Ant. & Post. vagi
  - Sympathetic $T_{5\to8}$: From coeliac plexus.

- Peritoneum of the stomach.
  . 2 sacs: . Greater sac: Covers its ant. surface.
  . Lesser sac: Covers its post. surface.

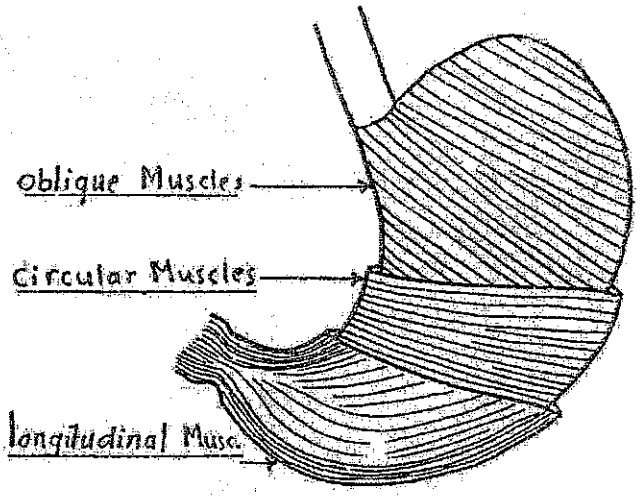
  . 2 omenta: . Greater omentum: attach greater curvature.
  : Lesser omentum: attach lesser curvature.

  . 2 Ligaments: . Gastro-splenic
  . Gastro-phrenic.

NB Due to embryological rotation of the stomach, the Lt vagus becomes anterior and the right becomes posterior.

- LNs: See theoretical

- **Musculosa:**
  - Inner: Oblique muscles.
    "Only in stomach"
  - Midde: Circular muscles.
    "Thick at pylorus"
  - Outer: Longtudinal muscles.
    "Thick at curvatures"



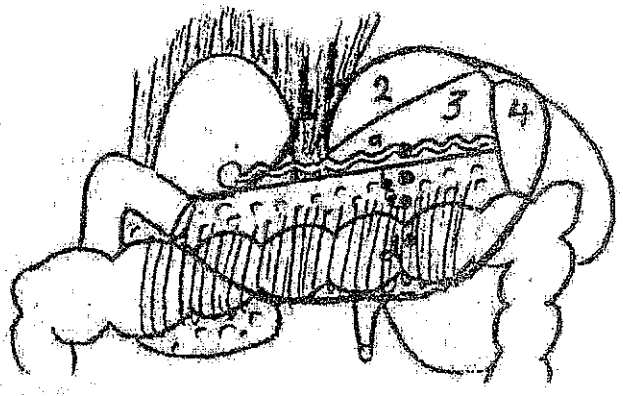
Relations of stomach:

- Ant:
  1- Liver
  2- Diaphragm
  3- Ant. abdominal wall.

- Post: "Stomach bed"
  - 4 sup. (From med. to lat):
    1- Lt crus of diaphragm.
    2- Lt supra-renal gland.
    3. Lt kidney.
    4. Spleen.
  - 4 inf. (From sup. to inf.):
    a. Splenic artery
    b. Pancreas.
    c. Transverse mesocolon.
    d. Transverse colon.

NB → Cavity of lesser sac:
Separates stomach from its bed.

2 Lymphatic drainage:
See theoretical notes.

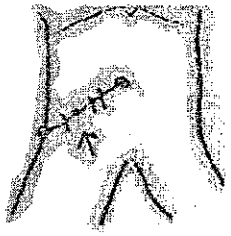


Appendix

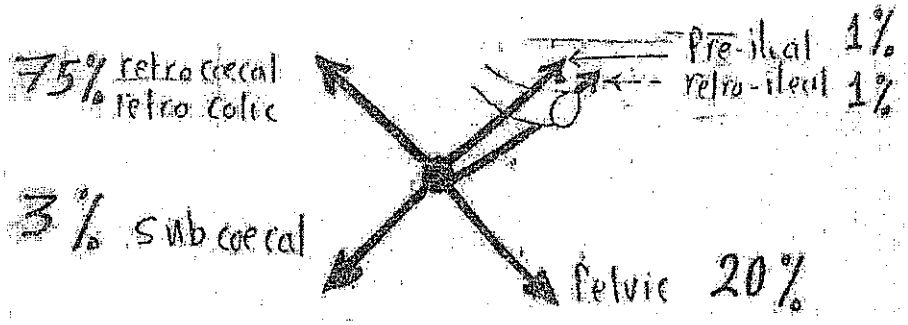
- ½ - 9" long.
- Opens in posteromedial aspect of caecum, 1" below ileo-caecal valve.
- Lies in retro-caecal recess behind caecum.

- **Surface anatomy:**

A) Its opening: McBurney's point:
at junction of med. ⅔ & lat. ⅓ of line between umbilicus & ASIS.



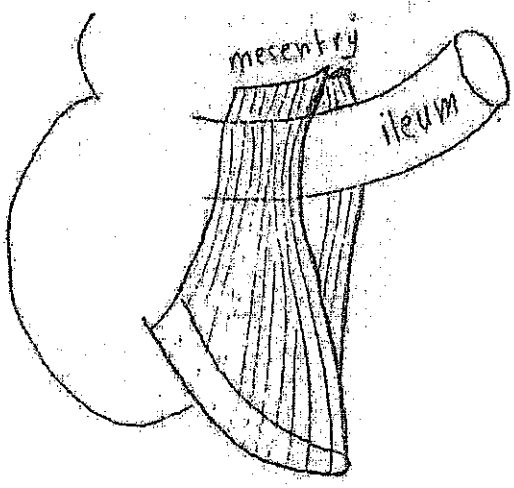
B) Its stem: Has 5 positions:



- **Peritoneum of appendix:**

= Meso-appendix:

- Triangular shaped, from ileum to appendix.
- Contains: 1- Appendix
  2- Appendicular artery.



Rectum

- 5" Long.
- Begins at S_3
- Ends 1" below and anterior to tip of coccyx.

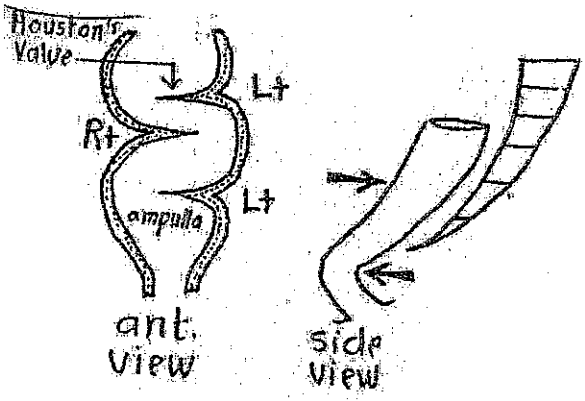
■ Peritoneum:

- Upper $\frac{1}{3}$: Peritoneum covers its sides & ant.
- Middle $\frac{1}{3}$: Peritoneum covers its ant. surface only.
- Lower $\frac{1}{3}$: No peritoneum.

■ 5 Flexures

1 Rt Flexure
2 Lt Flexures
] = 3 Flexures.

+ Takes concavity of sacrum (sacral flexure).
+ Curves backwards to form anal canal (perineal flexure)



■ Houston's valves:

3 folds of mucous membrane opposit the 3 Flexures projecting into cavity of rectum.

Function: Hanging faeces above them, thus allowing Flatus to pass.

■ Rectal ampulla: Dilated lower $\frac{1}{3}$ of rectum, usually empty and not contain faeces except during defecation.

■ Arterial supply of rectum & anal canal:

1- Superior rectal artery: continuation of inf. mesenteric a.
2- Middle rectal artery: from ant. division of internal iliac.
3- Inferior rectal artery: from internal pudendal.
4- Median (& lat.) sacral artery: from bifurcation of aorta.

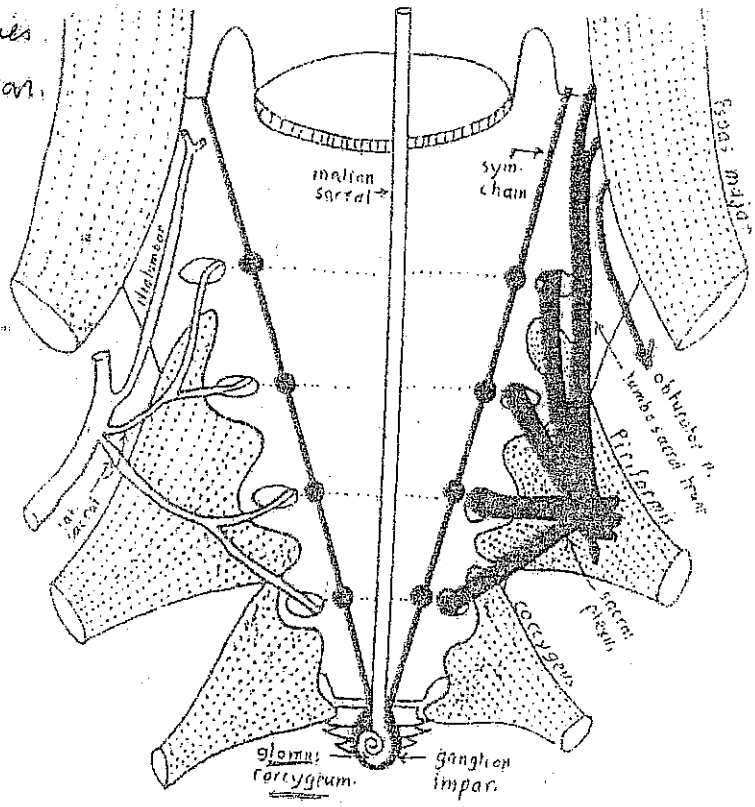
Relations:

- **Posterior**: Sacrum and its anterior relations below S_3:

1. Median & lower lat sacral arteries.
2. Glomus coccygeum & ganglion impar.
3. Sacral plexus.
4. Sympathetic chain.
5. Piriformis & coccygeus.
6. Levator ani (pubo-rectalis) at anorectal ring.

⊕ $S_{3,4,5}$ vertebrae.

⊕ Coccyx.



- **Anterior:**

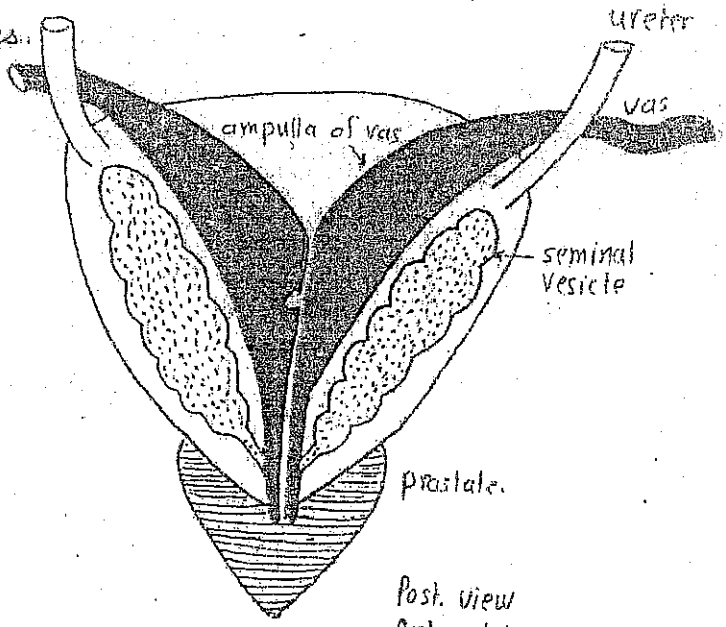
* In ♂:

1. Base of bladder.
2. End of ureters.
3. Ampulla of vas.
4. Seminal vesicles.
5. Prostate.
6. Vesical & prostatic venous plexuses.

⊕ Recto-vesical pouch.

* In ♀:

- Douglas pouch separating it from vagina & uterus (cervix).



Post. view
= Ant. relations of sacrum.

- **Lateral:**

Para rectal fossae containing loops of: - Small intestine
- Sigmoid colon.

Lymphatic drainage of the rectum:

① Upper ½ of the rectum:

It is drained along the superior rectal vessels into the following nodes:
- Para rectal nodes (on each side of the rectum).
- Inferior mesenteric nodes (around the origin of the inferior mesenteric artery).

② Lower ½ of the rectum:

It is drained along the middle rectal vessels into the internal iliac nodes.

Anal canal

■ Lining of anal canal : (mucosa).

A] Above pectinate line = 1-5 cm

. Simple columnar epithelium + has longitudinal elevations (6-12) called anal columns of Morgagni.

B] Below pectinate line (between it & white line) = 1.5 cm.

. Called transitional area lined with modified skin (no sweat glands).

C] Below white line (between it & anus) = 0.8 cm

. Lined with skin.

■ Arteries:

1- Above pectinate line: Superior & middle rectal ar.

2- Below pectinate line: Inferior rectal ar.

■ Veins:

1- Above pectinate line: Internal rectal (hemorrhoidal) plexus.

2- Below pectinate line: External rectal (hemorrhoidal) plexus.

■ Relations of anal canal:

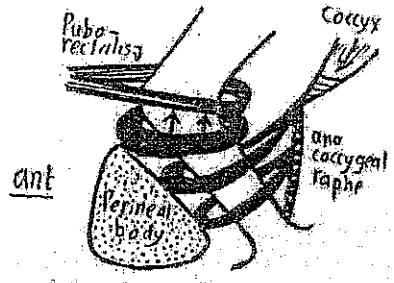
. ant: perineal body + in ♂ : root of penis.
in ♀ : vagina.

. post: ischio-rectal fossa + ano-coccygeal ligament.

. lat: ischio-rectal fossa + all its contents.

▪ Musculosa of anal canal: = Anal sphincters:

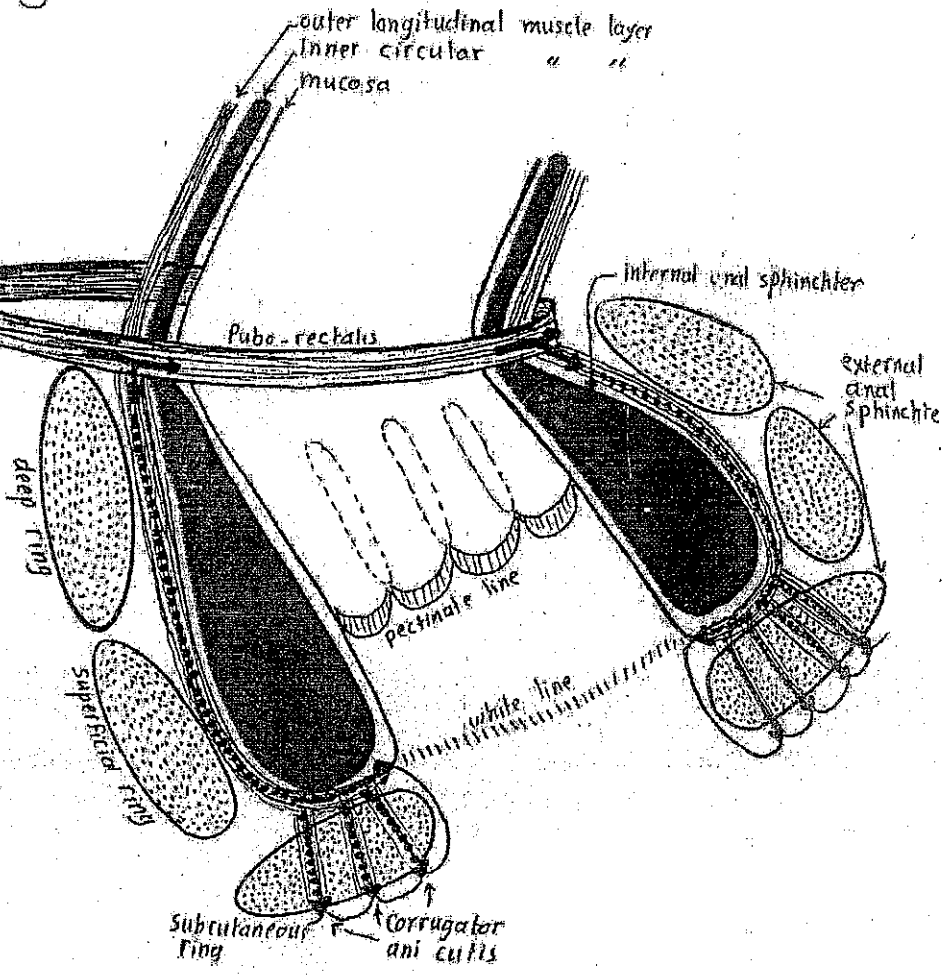
1- External anal sphincter.
2- Internal anal sphincter.
3- Pubo-rectalis
4- Outer longitudinal layer.



Attachments of external sphincter

External Anal Sphinchter

3 rings: deep, Superficial, Subcutaneous



	Embryology	Mucosa	Ar. & Veins	Nerve supply	L.Ns
Anal canal above pectinate line	Endodermal from cloaca	Simple columnar	Portal	Autonomic by inf. hypogastric plexus (Painless)	internal iliac LNs
Anal canal below pectineal line	Ectodermal from proctoderm	Modified skin (No sweat glands)	Systemic	Somatic by sup. rectal nerve + perineal branch of S_4 (painful)	Superficial inguinal LNs.

Ureter :

- 25 cm

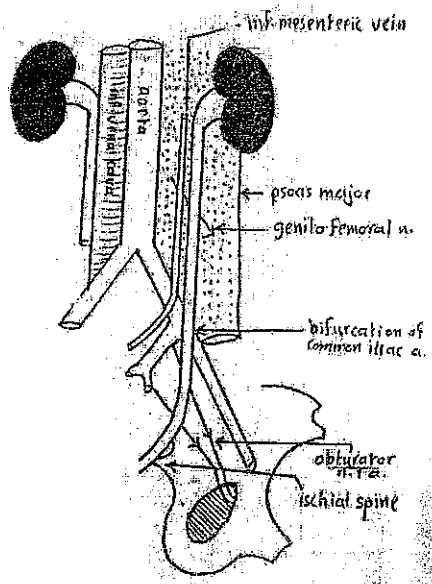
▪ Parts :

1. Pelvis of ureter (at hilum of kidney).
2. Abdominal part.
3. Pelvic part.
4. Intramural part (in wall of bladder).

▪ Relations :

- Posterior :

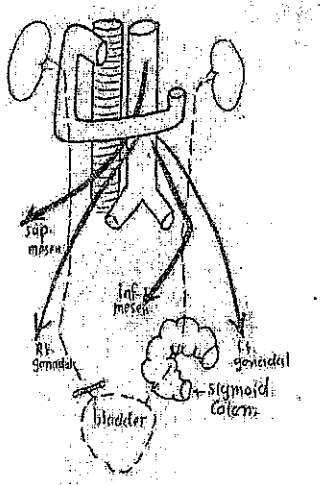
- In abdomen : - Psoas major.
  - Genito-femoral n.
- In pelvis : - On bifurcation of common iliac a.
  - On obturator n. & vessels.
  - On ischeal spine.



post. relations

- Anterior :

- Gonadal vessels : testicular or ovarian.
- Superior mesenteric (on Rt)
- Inferior mesenteric (on Lt)
- Duodenum (2nd & 3rd) (on Rt).
- Sigmoid colon (on Lt).

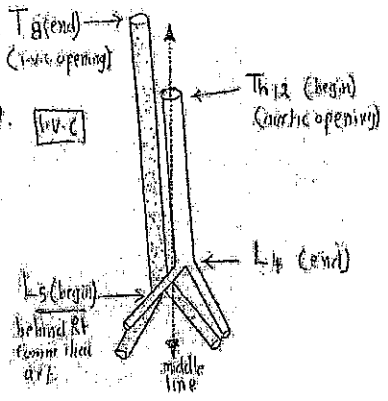


ant. relations

▪ Arterial supply :

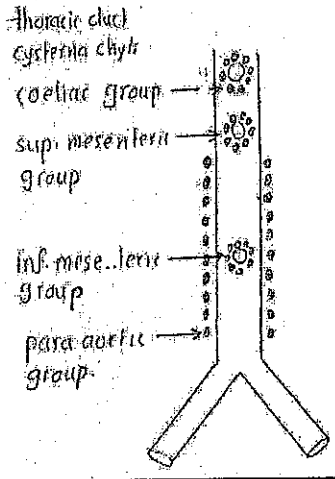
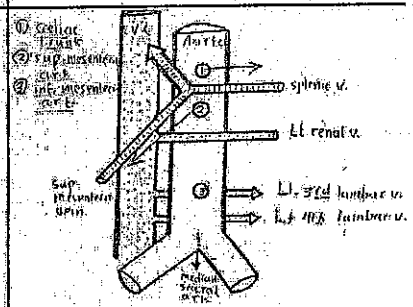
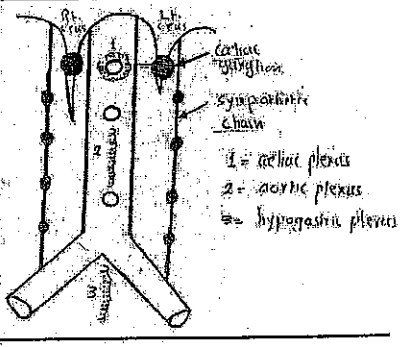
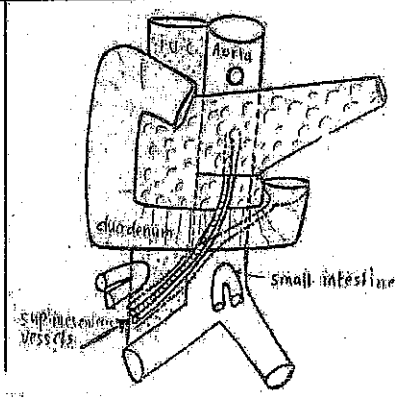
- In abdomen : From : . aorta.
  - . Renal artery.
  - . Gonadal artery.
- In pelvis : from : . Common iliac artery.
  - . Inferior vesical artery.

Abdominal aorta



- Begins at : Aortic opening of diaphragm (at level of T_{12}).
- Ends at : L_4 (1cm Left to middle line.
- Ends by : Rt & Lt common iliac arteries.

■ Relations :

	Ant.	Post.	Rt.	Lt.	
With arteries	• Coeliac trunk • Sup. mesenteric • inf. " " • 2 inf. phrenic aa • 2 gonadal aa.	• Lumbar aa. • median sacral a.	• Rt middle supra-renal • Rt renal a.	• Lt middle supra renal. • Lt renal a.	
With LNs	• Coeliac group • Sup. mesenteric group • Inf. mesenteric group.		• Rt para-aortic group. • Cysterna chyli • Thoracic duct.	• Lt para-aortic group.	
With veins.	• Splenic vein • Sup. mesenteric v. • Portal v. • Lt renal v.	• Lumbar veins 3rd & 4th ± 1st & 2nd	• IVC		
With nerves	• Coeliac plexus • Aortic plexus.		• Rt coeliac ganglion. • Rt sympathetic chain.	• Lt coeliac ganglion. • Lt sympathetic chain.	
With viscera & others.	• Pancreas. • Duodenum (3rd part). • Small intestine • Root of mesentery. • Peritoneum.	• Upper 4 lumbar vertebrae (bodies). • Ant. longitudinal ligament.	• Rt crus of diaphragm. • Rt supra-renal gland.	• Lt crus of diaphragm • Lt supra-renal gland.	

- Branches of aorta

- 4 single branches:

Branch	Level	Supply.
Coeliac trunk.	- Lower border of T_{12} OR - Upper border of L_1	- Foregut including: Liver, spleen, pancreas.
Superior mesenteric	- Lower border of L_1	- Mid gut + part of pancreas.
Inferior mesenteric.	- Middle of L_3	- Hind gut.
Median sacral	- Middle of L_4	- Rectum - Sacrum. - Sacral canal.

1. **Coeliac trunk:**

Branches: a) Lt gastric artery.

b) Splenic artery: 1- pancreatic arteries.
2- Short gastric arteries.
3- Lt gastro-epiploic artery.

c) Common hepatic artery:
1- Gastro-duodenal artery
Divides into: - Rt gastro-epiploic a.
- Sup. pancreatico-duodenal a.
2- Hepatic artery proper:
Gives: - Rt gastric artery.

2. **Superior mesenteric artery:**

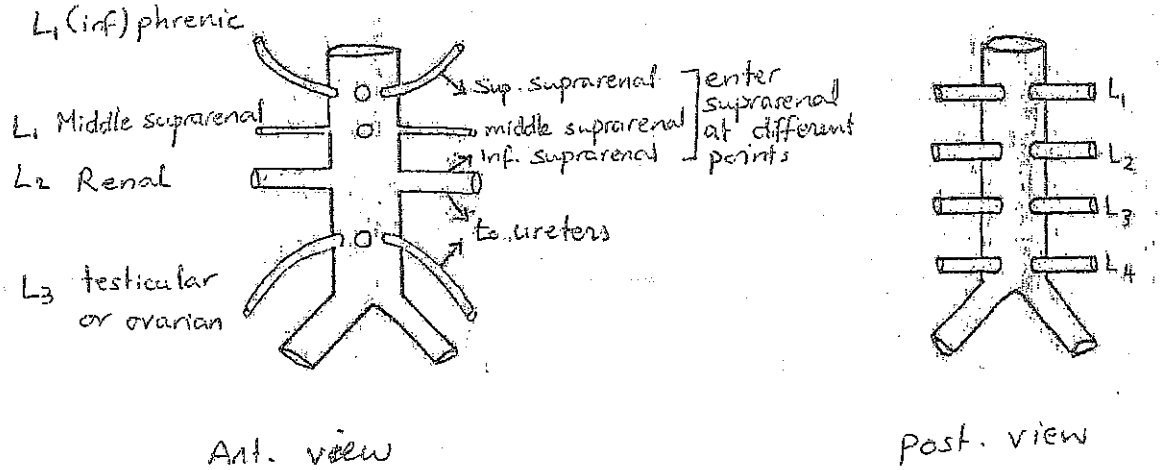
Branches: a) 2 inf. pancreatico-duodenal.
b) Jejunal & ileal branches.
c) Middle colic artery.
d) Rt colic artery.
e) Ileo-colic artery.

3 Inferior mesenteric artery:

Branches: a) Superior Lt colic artery.
b) Inf. Lt colic arteries.
c) Superior rectal artery.

• Paired branches:

- 2 from anterior surface: - Phrenic (L_1).
  - Testicular (L_3).
- 2 from lateral surface: - Middle suprarenal (L_1).
  - Renal (L_2).
- 4 from posterior surface: - 4 lumbar arteries.



Ant. view Post. view

Diaphragm:

- **Origin:**

A - Sternal: Xiphoid cartilage.

B - Costal: Lower 6 costal cartilages.

C - Vertebral:

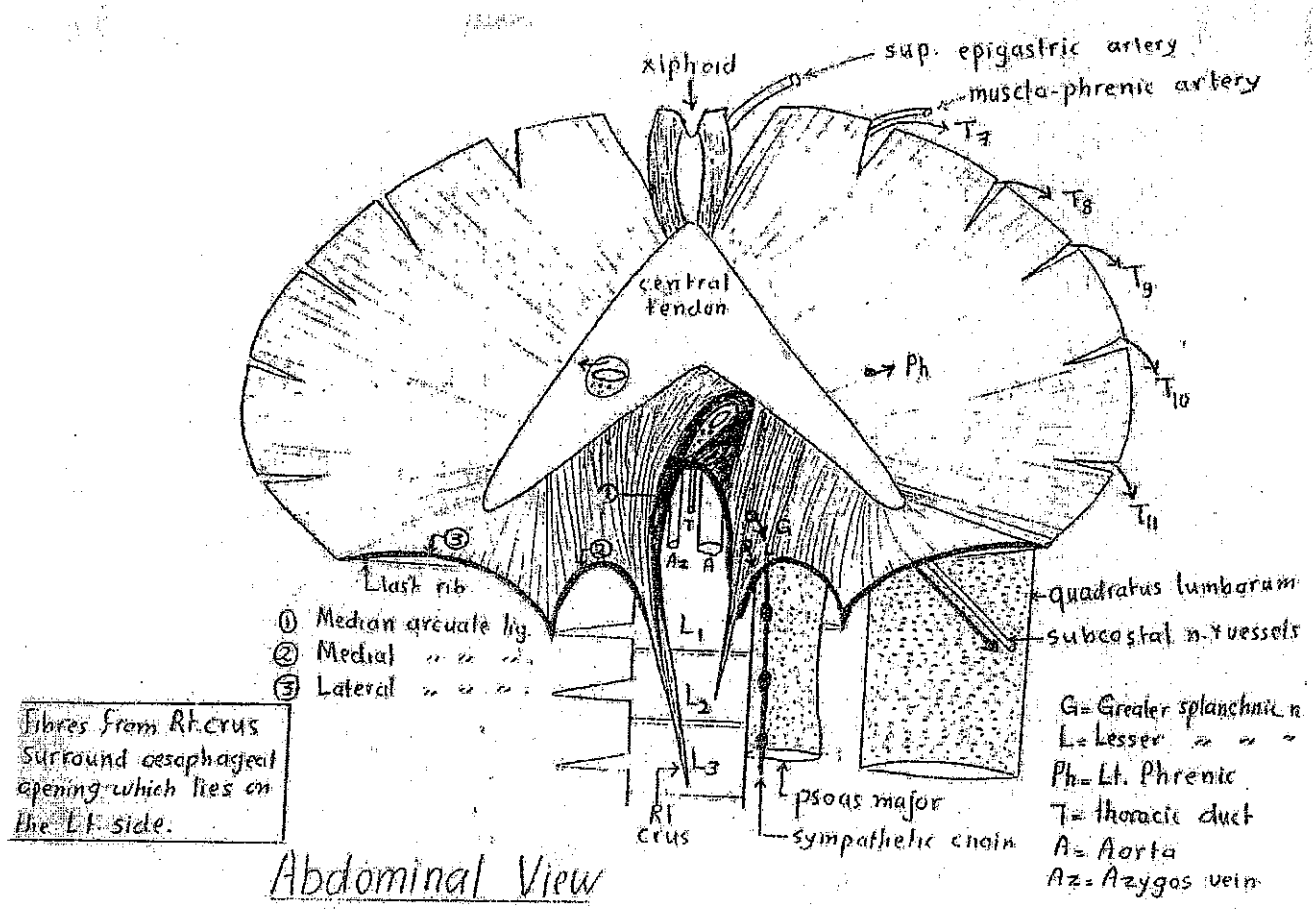
- 2 Crura ↗ Rt from bodies of L_{1-2-3}
  ↘ Lt from bodies of L_{1-2}

- 5 arcuate ligaments:
  - 1 Median: Between the 2 crura.
  - 2 Medial: Between crus & tip of transverse process of L_1
  - 2 Lateral: Between: . Tip of transverse process of L_1
    - Tip of last rib.

- **Insertion:**

- Central tendon of diaphragm:
  V-shaped - apex ant.

Contains: inf. venacaval opening.



Abdominal View

▪ Openings of the diaphragm:

1- Caval (T_8): . IVC
. Rt & Lt phrenic nerves.

2- Anterior hiatus (T_9): . Superior epigastric artery & vein.

3- Oesophageal (T_{10}): . Oesophagus
. Lt & Rt vagus nerves.
. Oesophageal branches of Lt gastric artery/vein.
. Lymphatics.

4- Aortic (T_{12}): "Strictly behind diaphragm". . Aorta.
. Azygos & hemi azygos veins.
. Thoracic duct.

5- Crura (T_{12}): . Greater, lesser & least splanchnic nerves.

6- Behind medial arcuate ligament: . Sympathetic chain.

7- Behind lateral arcuate ligament: . Subcostal (T_{12}) neurovascular bundle.

▪ Relations:

- Right dome reaches 4th costal space (nipple) in expiration.
- Left dome reaches 5th rib in expiration.
- Superior: . Pericardium
. Basal lung segments.
- Inferior: . Rt: . Liver
. Suprarenal.
. Kidney
. Lt: . Stomach
. Suprarenal
. Kidney
. Spleen.
- Posterior: Aorta, Azygos vein, oesophagus, vagi, pleural folds.

Anatomy MCQ
Notes

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2011

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ABDOMEN

Mark each of the following statements as true (T) or false (F):

1) The diaphragm:

a) Is attached to the sternum, costal cartilages, the psoas fascia, the transversalis fascia and the vertebral bodies
b) Is attached to the lesser trochanter of the femur
c) Receives its nerve supply from all lumbar nerves
d) Both flex the hip joint and the trunk
e) Gains attachment to the femur by passing below the pubic rami

2) The inguinal canal:

a) Extends below a defect in the transversalis fascia and a defect in the external oblique aponeurosis.
b) Has an anterior wall comprising the external oblique aponeurosis and the internal oblique muscle
c) Has its floor formed by the deep fascia of the thigh
d) Has its posterior wall formed medially by the peritoneum.
e) Is longer in the newborn than the adult

3) The abdominal oesophagus:

a) Enters the abdomen between the right and left crus of the diaphragm
b) Is enveloped by the peritoneum
c) Is closely related to both the anterior and posterior gastric nerves
d) Is closely related to the left lobe of the liver
e) Is surrounded by an external oesophageal sphincter

4) The oesophagus:

a) Commences about 25 cm from the incisor teeth
b) Receives a parasympathetic innervation from the greater splanchnic nerve.
c) Has smooth muscle forming its longitudinal and circular muscle coats.
d) Has numerous mucous glands extending into the vascular submucosa.
e) Has a venous drainage to both portal and systemic circulations.

5) In the stomach, the:

a) Fundus lies above the level of the oesophageal opening
b) Body extends inferiorly to the angular notch
c) Right border is known as its greater curvature
d) Cardiac orifice is closely related to the aorta
e) Blood supply arises from midgut arteries

6) The stomach:

a) Is supplied in part by arteries arising from the splenic artery
b) Is supplied by arteries which each arise from branches of the coeliac trunk
c) Have a venous drainage passing equally to the portal and systemic venous systems
d) Is lined by columnar and squamous epithelium

7) The appendix:

a) Arises from the inferior aspect of the caecum
b) Has a mesentery
c) Is commonly absent
d) Usually lies retrocaecally
e) Is clothed in peritoneum

8) The liver:

a) Is attached to the diaphragm and anterior abdominal wall by the ligamentum venosum.
b) Is totally covered by peritoneum.
c) Is divided on the visceral surface into two lobes by the interlobar fissure.
d) Has a fibrous capsule.
e) Has an embryological remnant connecting it to the umbilicus.

9) The liver:

a) Drains by hepatic veins into the inferior vena cava.
b) Has lymph drainage to both the mediastinal and porta hepatis nodes.
c) Is supplied by the phrenic nerves.
d) Is directly related to the right suprarenal gland.
e) Gains an arterial supply from the coeliac axis.

10)The common bile duct:

a) Enters the duodenum 10 cm beyond the pylorus.
b) Lies between the portal vein and the pylorus.
c) Lies anterior to the inferior vena cava in part of its course.
d) Usually has an opening into the duodenum separate from the main pancreatic duct.
e) Receives the right and left hepatic ducts.

11)The gall bladder:

a) Lies adjacent to the tip of the 10^{th} right costal cartilage.
b) Is closely related to the duodenum
c) Is supplied by a branch of the right hepatic artery.
d) Is lined by Squamous epithelium
e) Is usually completely covered by peritoneum.

12)The spleen:

a) Lies deep to the left 9th, 10th and 11th ribs.
b) Is separated by the diaphragm from the chest wall.
c) Is closely related to the stomach
d) Is separated by the stomach from the tail of the pancreas.
e) Is closely related to the left kidney.

13)The pancreas:

a) Is completely invested in peritoneum.
b) Usually has two major ducts.
c) Lies anterior to the right and left renal veins.
d) Is closely related to the bile duct.

14)The kidneys:

a) Lies with their hila at the level of the 4th lumbar vertebra.
b) Lies in a fascial sheath with their related suprarenal gland.
c) Are related posteriorly to the lower ribs.
d) Possess a hilus on their medial border in which the pelvis of the ureter lies anterior to the renal artery and posterior to the renal vein.
e) Drain lymph to para-aortic lymph glands.

15)The left kidney:

a) Is separated from the psoas major muscle by the quadratus lumborum muscle.
b) Is crossed posteriorly by the body of pancreas.
c) Has cubical epithelium lining the proximal convoluted tubules.
d) Develops from the pronephros.
e) Is closely related to the splenic vessels.

16)The ureters:

a) Has an abdominal course which is different in each sex.
b) Lie anterior to branches of lumbar plexus and posterior to the anterior branches of the aorta.
c) Has a pelvic course which is different in each sex.
d) Turn medially over levator ani at the level of the ischial spine.
e) Gain a sensory nerve supply from the autonomic nervous system.

17)The suprarenal gland:

a) On the right side lies on the right crus of the diaphragm.
b) On the left side lies on the left crus of the diaphragm.
c) On each side is related to the inferior vena cava.
d) Receives its nerve supply from branches of the thoracic sympathetic trunk.
e) Lies alongside the celiac axis.

18)The psoas major muscle:

a) Is attached to the middle of the sides of the lumbar vertebral bodies.
b) Is attached to the lesser trochanter of the femur
c) Receives its nerve supply from all the lumbar nerves.
d) Both flex the hip joint and the trunk.
e) Gains attachment to the femur by passing below the pubic rami

19)The abdominal aorta:

a) Ends anterior to the body of the fourth lumbar vertebra
b) Has the cisterna chili lying on its left side.
c) Has the inferior vena cava lying on its right side.
d) Is related anteriorly to the right renal vein.
e) Lies in close relationship with the lumbar vertebrae.

20)The renal arteries:

a) Arise from the aorta at the level of the 2^{nd} lumbar vertebra.
b) Are both related posteriorly to the crus of the diaphragm of the same side.
c) Supply branches to the corresponding suprarenal gland and ureter.
d) Give testicular (or ovarian) branches.
e) Are of unequal length; the left artery is longer than the right.

21)The rectum:

a) Begins in front of the 1^{st} sacral vertebra.
b) Has no mesentry.
c) Forms the posterior wall of a peritoneal pouch.
d) In the male is related anteriorly to the seminal vesicles and prostate.
e) Is related anteriorly to the cervix.

22)The rectum:

a) Is related posteriorly to the 3^{rd}, 4th and 5^{th} sacral nerves.
b) Has a lining of stratified Squamous epithelium.
c) Has a venous drainage into the superior mesenteric vein.
d) Sends lymph vessels to the superficial inguinal nodes.
e) Is a straight structure.

23)The anal canal:

a) Possesses an internal sphincter of voluntary muscle.
b) Possesses an external sphincter supplied by parasympathetic nerves.
c) Is adjacent to the ischiorectal fossa.
d) Has lymph drainage to both the nodes around the common iliac vein and to the superficial inguinal nodes.
e) Is lined by both columnar and squamous epithelium.

24)The pectoralis major muscle:

a) Has a clavicular attachment to the middle third of the anterior surface of the clavicle.
b) Has a costal attachment to the 3rd, 4th, and 5th ribs near the costochondral junctions.
c) Has an attachment to the upper part of the external oblique aponeurosis.
d) Is attached to the lateral lip of the lower part of the intertubercular groove.
e) Receives its nerve supply from the lateral and posterior cords of the brachial plexus.

HEAD AND NECK

1) The tongue:

a) Has a foramen caecum situated at the bas e of the frenulum.
b) Is separated from the epiglottis by the valleculae on each side of the midline.
c) Has 7-12 circumvallate papillae situated just behind the sulcus terminalis.
d) Is attached to the hyoid bone by the genioglossus muscle.
e) Musculature is derived from 2nd pharyngeal arch mesoderm.

2) On the tongue:

a) Circumvallate papillae are innervated by the glossopharyngeal nerve.
b) Lymph drainage of the posterior third is to the submandibular lymph nodes.
c) Lymph drainage of the anterior two-thirds is to the submandibular nodes.
d) Posterior third develops from two lateral lingual swellings.
e) Taste impulses from the posterior third travel in the glossopharyngeal nerve and are relayed in the nucleus of the tractus solitaries.

3) The parotid gland:

a) Is separated from the submandibular gland by the sphenomandibular ligament.
b) Is related anteriorly to the lateral pterygoid muscle.
c) Is related posteriorly to the sternomastoid muscle.
d) Has the external carotid artery running superficial to the fascial nerve within its substance.
e) Receives secretomotor fibres from the fascial nerve.

4) The submandibular gland:

a) Like the sublingual receives its parasympathetic innervation from the fascial nerve.
b) Is grooved superiorly by the loop of the lingual artery.
c) Overlies the glossopharyngeal nerve.
d) Is a mixed salivary gland.
e) Develops from second pharyngeal mesoderm.

5) The submandibular duct:

a) Lies deep to mylohyoid.
b) Opens at the base of the frenulum.
c) Passes deep to the lingual nerve.
d) Passes superficial to the lingual nerve.
e) Receives all the sublingual gland secretion.

6) The carotid sheath:

a) Is attached superiorly to the base of skull.
b) Fuses with the pericardium inferiorly.
c) Lies deep to the prevertebral fascia.
d) Encloses the jugular vein and vagus nerve.
e) Encloses the external carotid artery.

7) The sternomastoid muscle:

a) Is innervated by the 2^{nd} and 3^{rd} cervical nerve roots.
b) Is surrounded by the cervical fascia.
c) Is attached superiorly along the lateral half of the superior nuchal line.
d) Acting with its fellow of the opposite side to retract the face.
e) Ha s a single inferior attachment to the upper medial third of the clavicle.

8) The parathyroids:

a) Lie between the thyroid gland and the trachea.
b) Receive a rich blood supply from the superior and inferior thyroid arteries.
c) Develop eosinophil staining cells around puberty.
d) Develop from a 3^{rd} and 4^{th} pharyngeal arch mesenchyme.
e) Are usually 6-8 mm across.

9) The common carotid artery:

a) Terminates at the level of the upper border of the thyroid cartilage.
b) Is a posterolateral relation to the thyroid gland.
c) Is crossed anterolaterally by the omohyoid muscle.
d) Is crossed anterolaterally by the sternomastoid muscle.
e) At its bifurcation, has baro- and chemoreceptors which are richly innervated by the glossopharyngeal nerve.

10)The middle meningeal artery:

a) Passes through the foramen ovale.
b) Lies in the anterior cranial fossa.
c) Lies in intimate relationship with the skull.
d) Lies deep to the zygomaticofrontal suture.
e) Also supplies the diploe.

11)The internal carotid artery:

a) Enters the skull and then divides into the middle and posterior cerebral arteries.
b) Is separated from the external carotid artery by the glossopharyngeal nerve.
c) Is crossed laterally by the posterior belly of the digastric muscle.
d) Is crossed laterally by the fascial nerve.
e) Within the cavernous sinus is related to the mandibular nerve.

12)The internal carotid artery:

a) Lies in the floor of the inner ear.
b) Grooves the lesser wing of the sphenoid bone.
c) Lies lateral to the abducent nerve.
d) Pierces the diaphragma sellae medial to the anterior clinoid process.
e) Sends a branch through the optic canal.

13)The internal jugular vein:

a) Is a continuation of the transverse cranial venous sinus.
b) Receives the inferior petrosal sinus just below the base of the skull.
c) Has the last four cranial nerves as a medial relations at the base of the skull.
d) Is crossed laterally by the hypoglossal nerve.
e) Lies anterolateral to the sympathetic chain.

14)The internal jugular vein:

a) Is crossed posteriorly by the accessory nerve.
b) Lies medial to the styloid process and its muscles.
c) Is crossed anteriorly from lateral to medial by the phrenic nerve in the root of the neck.
d) Receives the anterior jugular vein.
e) Lies posterior to the subclavian artery.

UPPER LIMB

1) The latissimus dorsi:

a) Is attached to the lower six thoracic vertebrae.
b) Is attached to the lumbar and sacral vertebral spines.
c) Has no attachment to the chest wall.
d) Is attached to the inferior angle of the scapula.
e) Is a powerful flexor of the humerus at the shoulder joint.

2) The deltoid muscle:

a) Is a unipennate muscle.
b) Overlies the subacromial bursa.
c) Is proximally attached to the clavicle, acromion and scapular spine.
d) Is distally attached to anterior upper third of the humerus.
e) Is supplied by the radial nerve.

3) The axillary artery:

a) Extends to the lower border of teres major.
b) Lies posterior to the pectoralis minor.
c) Lies lateral to the medial cord of the brachial plexus.
d) Lies medial to the axillary vein.
e) Lies lateral to the short head of biceps.

4) The brachial artery:

a) Lies medial to biceps.
b) Can be palpated over most of its course.
c) Ends at the lower border of teres major by dividing into radial and ulnar arteries.
d) Is crossed by the median cubital vein.
e) Is crossed by the median nerve.

5) The radial nerve:

a) Is a terminal branch of the posterior cord of the brachial plexus.
b) Lies posterior to the humerus between the medial and lateral heads of triceps.
c) Passes anterior to the elbow joint.
d) Supplies the skin of the medial and anterior aspect of the forearm.
e) Supplies the supinator muscle.

6) The cubital fossa:

a) Is a quadrilateral space situated in front of the elbow joint.
b) Is floored by the bicipital aponeurosis.
c) Contains the median nerve.
d) Contains the radial nerve.
e) Is crossed by the medial cutaneous nerve of the forearm.

7) The flexor digitorum superficialis muscle:

a) Arises from both radius and ulna.
b) Lies deep to the median nerve.
c) Has four tendons in the hand which encircle the corresponding tendons of flexor digitorum profundus in the fingers.
d) Is attached distally to the base of the distal phalanx of the fingers.
e) Has its middle and ring finger tendons placed anterior to those of the index and little, when deep to the flexor retinaculum.

8) The radial artery:

a) Passes superficial to the brachioradialis.
b) Lies lateral to the radial nerve in the forearm.
c) Lies on the anterior surface of the lower end of the radius.
d) Passes between the two heads of the first dorsal interosseous muscle.
e) Terminates in the superficial palmar arch.

9) The ulnar artery:

a) Gives rise to the anterior interosseous artery.
b) Lies deep to the muscle attached to the common flexor origin.
c) Lies medial to the ulnar nerve.
d) Crosses superficial to the flexor retinaculum.
e) Supplies the deep extensor muscles of the forearm.

10)The radial nerve, in the forearm and hand:

a) Lies deep to brachioradialis.
b) Reaches the dorsum of the hand by passing across the lower end of the radius.
c) Passes deep to the extensor retinaculum.
d) Supplies the skin on the lateral aspect of the dorsum of the hand and the dorsum of the lateral four digits.
e) Has no muscular branches.

11)The posterior interosseous nerve:

a) Arises at the level of the elbow joint.
b) Lies in close relationship with the upper end of ulna.
c) Passes through the supinator muscle.
d) Supplies all the extensor muscles.
e) Supplies the elbow and wrist joints.

12)The median nerve in the forearm:

a) Passes between the heads of the pronator teres.
b) Lies deep to the flexor digitorum superficialis.
c) Passes deep to the flexor retinaculum.
d) Is a posterior relation of Palmaris longus.
e) Supplies all the forearm flexor muscles.

13)The median nerve in the hand:

a) Supplies all the short muscles of the thumb.
b) Supplies all the lumbrical muscles.
c) Lies superficial to the flexor retinaculum.
d) Terminates just distal to the flexor retinaculum.
e) Supplies the palmar surface of the lateral three and half digits.

14)The ulnar nerve:

a) Is an anterior relation of the medial epicondyle of the humerus.
b) Enters the forearm between the heads of the pronator teres.
c) Lies on flexor digitorum profundus in the forearm.
d) Supplies the ulnar half of the flexor digitorum sublimes.
e) Supplies the adductor pollicis.

15)The ulnar nerve in the hand:

a) Passes into the hand deep to the flexor retinaculum.
b) Supplies the dorsal surface of the medial two and half fingers.
c) Supplies all the interossei.
d) Supplies abductor pollicis brevis.
e) Supplies adductor pollicis.

16)The adult female mammary gland:

a) Lies deep to the deep fascia of the chest wall.
b) Extends from the side of the sternum to near the midaxillary line.
c) Has a subcutaneous and submammary plexus of lymph vessels.
d) Develops from modified skin glands.
e) Has a lymphatic drainage which extends to the anterior mediastinum.

LOWER LIMB

1) The sciatic nerve:

a) Is formed in the pelvis posterior to the fibres of the piriformis muscle.
b) Is directly related to the ischium.
c) Is directly related to the adductor magnus muscle.
d) Innervates part of the adductor magnus muscle.
e) Usually divides into its terminal branches just above the popliteal fossa.

2) The rectus femoris muscle:

a) Forms part of the quadriceps muscle.
b) Gains attachment from the lateral lip of the linea aspera.
c) Has a superior attachment to the anterior inferior iliac spine.
d) Has lower medial fibres that run almost horizontally to the patella.
e) Is partly supplied by the obturator nerve.

3) The great saphenous vein:

a) Passes behind the medial malleolus.
b) Passes anterior to the knee joint.
c) Is accompanied by the saphenous nerve in the lower leg.
d) Enters the femoral vein in the middle of the thigh.
e) Usually receives blood from the deep veins in the legs and thighs.

4) The femoral triangle:

a) Is bounded medially by the adductor longus muscle.
b) Is bounded laterally by the rectus femoris muscle.
c) Contains an extension of the transversalis fascia.
d) Contains both femoral artery and its vein.
e) Has a defect in its fascial roof.

5) The femoral artery:

a) Is formed behind the midpoint of the inguinal ligament.
b) Has the femoral nerve on its lateral side in the femoral triangle.
c) In the adductor canal has vastus medialis situated anterolaterally to it.
d) Lies posterior to Sartorius.
e) Leaves the thigh by passing inferior to the adductor magnus tendon.

6) The femoral vein:

a) Passes anterior to the upper attachment of the pectineus muscle.
b) Is separated by the femoral canal from the lacunar part of the inguinal ligament.
c) Lies anterior to its artery in the adductor canal.
d) Passes through a separate opening in the adductor magnus from the artery.
e) Has the saphenous nerve lying medially in the adductor canal.

7) The femoral nerve:

a) Is formed from the anterior divisions of the lumbar 2, 3 and 4 roots.
b) Is enclosed in the lateral part of the femoral sheath.
c) Lies in the groove between iliacus and psoas as it passes deep to the inguinal ligament.
d) Branches are divided into superficial and deep by the medial circumflex femoral artery.

8) The popliteal artery:

a) Enters the popliteal fossa through the adductor hiatus.
b) Lies deep on the lower posterior surface of the femur.
c) Gives off the perineal branch in the lower part of the popliteal fossa.
d) Is separated from the common perineal nerve by the popliteal vein.
e) Gives a branch to the extensor compartment of the leg.

9) The tibial nerve:

a) Lies on tibialis posterior in the upper calf.
b) Descends through the calf between flexor digitorum longus medially and flexor hallucis longus laterally.
c) Innervates both medial and lateral heads of gastrocnemius.
d) Innervates the skin over the back of the leg and the lateral border of the foot through its sural branch.
e) Gives rise to the medial plantar nerve.

10)The common peroneal nerve:

a) Is a branch of the femoral nerve.
b) Divides in the substance of the peroneus longus.
c) Is subcutaneous as it crosses the neck of the fibula.
d) Supplies the three perineal muscles through its superficial perineal branch.
e) Supplies the skin over the medial border of the hallux through the medial dorsal branch of the superficial perineal.

ABDOMEN MCQ ANSWERS					
NO.	a	b	c	d	e
1	T	T	F	T	T
2	T	T	F	F	F
3	F	F	T	T	F
4	F	F	T	T	T
5	T	T	F	F	F
6	T	T	F	F	T
7	F	T	F	T	T
8	F	F	T	T	T
9	T	T	F	T	T
10	T	T	T	F	F
11	F	T	T	F	F
12	T	T	T	F	T
13	F	T	T	T	T
14	F	F	T	F	T
15	F	F	T	F	T
16	F	T	T	T	T
17	T	T	F	T	T
18	F	T	F	T	F
19	T	F	T	F	T
20	T	T	T	F	F
21	F	T	T	T	T
22	T	F	F	F	F
23	F	F	T	T	T
24	F	F	T	T	F

HEAD& NECK MCQ ANSWERS					
No.	a	b	c	d	e
1	F	T	F	F	F
2	T	F	T	F	T
3	F	F	T	F	F
4	T	F	F	T	F
5	T	T	T	T	F
6	T	T	F	T	F
7	T	T	T	F	F
8	F	T	T	F	F
9	T	T	T	T	T
10	F	F	T	F	T
11	F	T	T	T	F
12	F	F	F	T	T
13	F	T	T	F	T
14	T	T	F	F	F

UPPER LIMB MCQ ANSWERS					
No.	a	b	c	d	e
1	T	T	F	T	F
2	F	T	T	F	F
3	T	T	T	F	F
4	T	T	F	T	T
5	T	T	T	F	F
6	F	F	T	T	T
7	T	F	T	F	T
8	F	F	T	T	F
9	F	T	F	T	T
10	T	T	F	F	F
11	T	F	T	F	T
12	T	T	T	T	F
13	F	F	F	T	T
14	F	F	T	F	T
15	F	T	T	F	T
16	F	T	T	T	T

LOWER LIMB MCQ ANSWERS					
No.	**a**	**b**	**c**	**d**	**e**
1	F	T	T	T	T
2	T	F	T	F	F
3	F	F	T	F	F
4	T	F	T	T	T
5	F	T	T	T	F
6	T	T	F	F	T
7	F	F	T	F	F
8	T	T	F	F	T
9	T	T	T	T	T
10	F	T	T	F	T

Comment on certain questions:

Abdomen:

Question no.10: the common bile duct:

C: the answer is ***true*** ….Behind the head of pancreas it lies anterior to the inferior vena cava.

Question no.19: the abdominal aorta:

B: the answer is ***false***….the cisterna chili lies between the right side of the aorta and the right crus of the diaphragm.

Question no.23: the anal canal

B: the answer is ***false***….the internal sphincter is an involuntary muscle and a continuation of the rectum's circular muscle coat. The external sphincter encircles the lower two-thirds of the anal canal and is arranged into deep, superficial, and subcutaneous parts. It is voluntary muscle supplied by the inferior rectal nerves and is reinforced by the levator ani muscle.

Thyroid gland

A. Applied anatomy of nerves related:

1. Effect of RLN injury :(nazary).

2. 3 % of people have RLN paralysis (without operation) may be due to viral infection and neuritis so do preoperative laryngoscopy (medicolegal).

3. In carcinoma of the thyroid : pain is refered to the ear along the Arnold nerve which is auricular branch of vagus .

4. The inferior thyroid artery is ligated in continuity (ligated and not divided) away from the gland to avoid injury of the recurrent laryngeal nerve .

5. The superior thyroid artery id ligated near the gland to avoid the injury of external laryngeal nerve .

B.Applied surgical importance for arterial supply:

1. As the superior thyroid vessels are superficial , in thyrotoxicosis a bruit is heard and thrill is felt at the upper border.

2. After ligation of main blood supply to the thyroid gland , the remaining part after thyroidectomy is still vascularized by the esophageal and tracheal arteries .

3. Middle thyroid vein should be the first vessel to be ligated to facilitate mobilization of the thyroid lobe.

4. Some surgeons don't ligate inferior thyroid artery to avoid vascular injury of parathyroid glands.

+ 4 and 5 in A

Applied surgical importance for lymph drainage :

1.Management of LN metastases in thyroid carcinoma (nazary).

2. Lateral aberrant thyroid.

Anatomy of the scalp

1. The scalp is very richly supplied by blood vessels and so wounds of the scalp, even if lacerated , heal nicely and usually without infection .

2.The arteries present in the subcutaneous layer are adherent to the fibrous tissue of this layer . When a vessel is injured , the muscular coat of the divided artery cannot retract and so bleeding is very profuse.

3. How to stop bleeding ? (nazary)

4. The layer of loose areolar tissue allows accumulation of large amounts of blood or inflammatory exudate. If infection occurs in the area of loose areolar tissue , extensive cellulitis is likely to occur .

Middle meningeal artery

1. Extradural hemorrhage due to rupture of the anterior division in the region of pterion especially as a result of a trauma to that area in the absence of a fracture especially in children .

2.Blood will pass inn 3 directions : (nazary)

Lymph drainage of head and neck

1.Any case of cervical lymphadenopathy , examine the face , scalp and oral cavity for possible primary lesion .

2. In case of enlarged hard left supraclavicular lymph node , search for possible infra diaohragmatic malignancy e.g , carcinoma of the stomach (Torouseir sign).

3. Types of block neck dissection (BND) : (nazary).

Parotid gland

Practical surgical application :

1. Being superficial to the masseter , swellings of the parotid gland become more prominent with contraction of the masseter.

2.Swellings of the deep lobe appear in the lateral pharyngeal wall,hence the importance of examination of the oral cavity in all cases of parotid swellings.

3.Regarding its relation to facial nerve:

The facial nerve and its branches are in danger during parotidectomy. So ,its important to know how to identify the facial nerve intraoperative.

Facial nerve palsy is a sign of malignant parotid tumor.

In drainage of parotid abscess: (nazary)

4.Treatment of clinically benign parotid tumors : (nazary)

Submandibular gland

1. Incisions done to remove the gland must be 2 fingers below and parallel to horizontal ramus of the mandible to avoid injury of cervical branch of facial nerve .

2. Clinically the submandibular gland is single , cannot be rolled over the mandible and can be felt from the oral cavity .

3. The submandibular LN are multiple, can be rolled over the mandible and cannot be felt from the oral cavity .

4. Being dependant and has viscid secretions , stones occur in it 50 times more than parotid gland .

Female breast

1. An abscess of the breast is opened by a radical incision to avoid cutting across a number of lactiferous ducts .

2.Dimpling of the skin over a carcinoma of the breasts results from malignant infiltration and fibrous contraction of coopers ligaments .

3. Regarding the lymphatic drainage :

Mention the (N) staging system.

Mention importance of lymphatic spread in prognosis of breast carcinoma .

The plexus of Sappy and another deep plexus on the pectoral fascia appear to be relatively unimportant . This change in description of lymphatic drainage changed the concepts of surgical treatments of breast carcinoma (beside being systemic from the start) from extensive surgical operations (radical , extended radical and super radical mastectomy) to much less extensive operations (modified radical mastectomy and QUARt).

Median and Ulnar nerves (C8, T1).

1. Carpal tunnel syndrome (in case of median nerve).

2. Mention effects of their injuries in different levels in short .

3. In case of Ulnar nerve :

Mention ulnar paradox

Anterior transposition of ulnar nerve to increase its length in its repair to treat delayed ulnar neuritis after cubitis valgus in supracondylar fracture.

Sternomastoid muscle

1. It divides the lateral aspect of the neck into anterior and posterior triangles .

2. Sternomastoid tumors in infancy may lead to congenital torticolis if improperly treated .

3. Sternomastoid muscles is excised in radical block neck dissection and preserved in selective block neck dissection .

4. Incision for thyroidectomy extends from anterior border of one sternomastoid to the anterior border of the other sternomastoid muscle .

Sternomastoid muscle

1. It may be used as a myocutaneous flap in reconstruction surgery .

2. Nerve to latissmuss dorsi may be injured during radical or modified radical mastectomy .

Femoral triangle

Applied anatomy :

1. Its common site of many surgical swellings :

   Aneurysm of femoral artery

   Saphena varix

   Femoral hernia

   Enlarged inguinal LN

2. Stap in the femoral triangle .

3. D.D of swellings in the femoral triangle :

   1. Reducible or compressible swellings :

      Saphena varix : bluish , compressible , impulse and thrill on cough , LL varicose veins.

      Aneurysm of femoral artery :

      compressible , expansible pulsations , systolic bruit , compression on the artery proximal to it reduces its size and distal increases its size .

      Psoas abscess :

      There is cross fluctuation between two swellings , above and below inguinal ligament .

   2.Irreducible swellings :

      Irreducible femoral hernia

      Lipoma

      Enlarged LN , iliopsoas bursa

Surgical anatomy of the inguinal canal

Applied anatomy :

1. Oblique inguinal hernia :

   Hernia defect (nazary)

   Coverings (nazary)

2. Direct hernia :

   Defect , coverings (nazary)

3. Anatomical factors which prevent hernia (nazary) .

Surgical anatomy of the rectus sheath

1. The rectus muscle can be used as a myocutaneous flap in plastic surgery based on superior or inferior epigastric artery e.g, in breast reconstruction .

2. In paramedian incision : the anterior rectus sheath is incised vertically and the rectus muscle is displaced laterally to preserve the vessels and nerves supplying the rectus muscle from the lateral side.

3. If present , the insertion of the pyramidalis muscle into the linea alba is a landmark for an accurate midline incision .

4. Rectus sheath hematoma (nazary).

Long saphenous vein

1. It can be used in coronary by-pass and by-pass graft in chronic ischemia of LL

2. Site of venous cut down above medial malleolus.

3.Site of varicose veins .

4.It is the commonest vein in the body to develop varicose veins for being :

> Largest vein in the body

> Dependent

5. In trendlenberg operation all the tributaries of the groin are ligated.

6. During operations on long saphenous vein at the ankle take care not to injury the saphenous nerve .

Stomach

1. Types of vagotomy (nazary).

2. To cut the criminal nerve of grassi : clean the lower 6 cm of the oesophagus .

3. A posterior gastric ulcer may erode the pancreas , giving pain referred to the back also ulceration into the splenic artery , a direct posterior relation , may cause serious hemorrhage .

4. In carcinoma of the oesophagus , the stomach is used to replace the resected oesophagus (Gastric pull-up operation).

Applied anatomy of the lymphatic drainage of the stomach:

1.From celiac glands spread may occur to porta hepatis glands which may lead to obstructive jaundice and to the umbilicus giving skin nodules (sister joseph sign).

2. Spread from celiac glands to thoracic duct to left supraclavicular glands (Virchow's gland) produces a positive Troisiers sign .

3. Troisier's sign , umbilical nodules , node at the porta hepatis , celiac or mesenteric lymph nodes enlargement indicates inoperability of carcinoma of the stomach.

4. During radical gasrectomy : lesser and greater curvatures must be removed in order the lymph node related to them , also , the first part of the duodenum is removed to be sure of removal of pyloric lymph nodes . Some surgeons advise splenectomy in order to remove the splenic lymph nodes .

Gall bladder

1. When performing a cholecystectomy , the surgeon must remember that there are many variations from the normal anatomy of the vessels and bile duct.

2. Triangle of calot is formed by common hepatic , cystic duct and the liver above.

3. Pain in acute cholecystitis is referred to the skin overlying the acromion (shoulder tip). As the phrenic nerve arises from the same segments of the spinal cord (C345) as supraclavicular nerve (C34) .

Vermiform appendix

1. Identification of appendix at operation : the 3 tenia coli coverage towards the base of the appendix to form a continous coat in its wall.

2. It's rare in infants (short appendix with wide base) , it becomes increasingly common I children and adults with maximum incidence at 20 -30 years (base become narrow), in elderly it becomes again (appendix atrophies) , although appendicitis is rare in extreme of age , it is most serious .

3. How the position of the appendix may change the clinical picture of acute appendicitis : (nazary).

4. The appendicular arteries run in the mesoappendix , but they are closely applied to the wall distally , therefore , with acute appendicitis , thrombosis with consequent gangrene is likely to affect the distal part of the appendix .

5.The most serious position is the preileal position as it carries the possibility of thrombophlebitis of the ileocolic vein with the risk of developing portal pyemia .

6. Why McBurney's point in spite of the different positions :

> as it's the site of the base of the appendix .

> not tender in displaced cecum

7. Acute appendicitis is more liable to cause generalized peritonitis in children , elderly persons , during pregnancy , diabetics and patients who had purgatives or enema .

Blood supply of the colon

1. In making a loop colostomy , the colostomy rod must be passed through the mesentery immediately so that the marginal artery is not damaged.

2. The lymph nodes draining a part of the large bowel converge on the aortic origin of the vessels supplying that part , the extent of bowel resection in carcinoma is thus determined by the length of bowel supplied by the arterial trunk to the area involved by the disease .

Blood supply of the rectum

1. A porto-systemic anastomosis occurs in the submucosa of rectum and anal canal between the previous 3 veins (nazary) and it's dilatation leads to anorectal varices .

2. As lymphatic drainage of the rectum follows it's arterial supply , so it passes in three directions (but mainly upward) , and on this basis resection of the rectum in cases of carcinoma will depend , and give an example .

3. Why bleeding anorectal varices is not so serious as bleeding esophageal varices :

> the vessels are compressed by the anal sphincters .

> it manifests early.

> no –ve intrathoracic pressure .

> no trauma by food and acids .

Kidneys

1.The kidney is anatomically divided into segments by it's blood supply which makes it possiple to carry out segmental resections of the kidney .

2. The intrarenal lymph vessels communicate freely with the plexus in the perinephric fat , therefore it is essential to remove the perinephric fat in radical nephrectomy .

3. The kidney can be approached either by :

> Lumbar incision (the usual way).

> Transabdominal approach in cases of trauma or tumors .

4. Malignant thrombus from hypernephroma may extend in the renal vein orIVC and may cause secondary varicocele .

Ureter

1. Exposure : (nazary)

2. Intraoperative identification by : (nazary)

3. It may be obstructed by cancer cervix , cancer cecum , sigmoid tumor or retro-peritoneal tumor .

4. It may be injured during certain operations e.g, hysterectomy and sigmoid colectomy .

Spleen

1.In performing a splenectomy the close relation of the pancreatic tail to the hilum and splenic pedicle must be remembered , it 's easily wounded.

2. Note the close proximity of the lower ribs . lowest part of the left lung and pleural cavity , left diaphragm , left kidney and the spleen , injuries to the left upper abdomen may damage any combination of these structures .

3. Accessory spleens (splenules) may occur most commonly near the hilum , but also in the tail of pancreas , the mesentery of the spleen , the omentum , small bowel mesentery , ovary and even testis and if left behind , may result in persistence of sympyoms fpllowing splenectomy for hemolytic anemias or thrombocytopenia.

4. patients with fractures at the left 9 , 10 , 11 ribs should have be observed closely , because they are candidates for an underlying splenic rupture .

5. The segmental blood supply makes segmental resection possible , this could be important where preservation of splenic tissue is necessary .

6. Enlarged spleen usually directed to the right iliac fossa by phrenico-colic ligament .

7. During splenectomy the following structures may be injured : stomach , diaphragm , pancreatic tail , left kidney and the colon (to be prepared preoperatively in difficult splenectomies).

8. Distal splenorenal shunt (warren operation) : is one of operations for portal hypertension .

Aklek menen ya bata

Part 1 :

Thyroid >>>> youm

1. carcinoma , STN , complications of surgery , ttt toxic goitre.

2. thyroglossal cyst , retrosternal goiter , complications of SNG , ttt of SNG, ...welba2y

Breast>>>>>youm

1.carcinoma (staging , spread , investigations , DD ,ttt of early cancer)+ discharge.

2.Acute lactational mastitis , ba2y el carcinoma + ... welba2y.

Arterial>>>>> youm

1. Aneurysm , diabetic foot , acute ischemia , embolism , injury .

2. .....welba2y.

Venous disorder+ Face +Hand >>> youm

1. DVT (mohem gedan) + tongue cancer + jaw swelling + hand .

2. .....welba2y .

Skin, lymphatic, salivary , muscle we tendon >>> youm

1. SCC+ BCC + melanoma + salivary tumors + lymphedema .

2. ba2y el lymph + vascular malformations +.....welba2y .

Part 2:

Nerve + oesophagus >>>> youm

1. nerve .

2. oesophagus .

1c	26 d
2b	27a
3d	28 b
4a	29 a
5c	30 d
6A	31 b
7d	32 c
8b	33 d
9a	34 c
10 d	35 b
11c	36 a
12a	37 b
13d	38 c
14a	39 c
15b	40 a
16a	41 b
17b	42 d
18d	43d
19c	44 c
20c	45c
21b	46b
22d	47 a
23d	48 d
24b	49 a
25 a	50 c